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COMMUNICATIONS IN CHINA

MANCHUOKUO AND THE OPEN DOOR POLICY

MANCHUOKUO'S FOREIGN TRADE IN 1934

THE REALISTIC FOREIGN POLICY OF JAPAN

Vol. XXXI MARCH, 1935 No. 3

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ENGINEERING FINANCE COMMERCE

VOL. XXXI SHANGHAI, MARCH, 1935 No. 3

Communications in China

Minister in Broadcast Address Reviews Achievements of Recent Years and Outlines Plans and Projects for 1935

By Dr. CHU CHIA-HUA, Minister of Communications

Full text of speech delivered over Station XGOA, Central Broadcasting Station, Nanking, on February 15.

* * *

It was in the last year that the Central Broadcasting Station asked me to speak on the present state of communications in our country. Not until now can I find time to do so. When I assumed the post as Minister of Communications in the winter of 1932, I felt that as communications are of vital importance to the existence of a nation as well as to the welfare of the people, it is of course undesirable to adopt any policy that aims at keeping the *status quo* or curtailing the range and scope of activities. For financial reasons, however, only moderate measures could be adopted with a view to maintaining what was already existing. The first steps taken were, therefore, generally confined to the reorganization of the various enterprises under the control of the Ministry, such as the enforcement of discipline among the rank and file of the staffs, the introduction of independent accounting, the unification and strengthening of the internal organization of the telegraph service, the laying of a foundation for the amalgamation of Post and Telegraph, the abolition of the registering offices of the Marine and Navigation Bureaux, the reduction of the number of staff members and of the scope of administration in the postal establishments and telegraph and telephone offices, in the China Merchants' Steam Navigation Company, in the Eurasia Aviation Corporation and the China National Aviation Corporation with a view to the development of these enterprises through the commercialization of the services and the improvement of their management.

At present, the crisis in the history of the postal service is happily over and discipline and order have been gradually restored. The financial statement of the service for the last fiscal year shows a profit of more than $1,200,000, not including that part of the gross profit transferred to the account of the payments made for the development of commercial aviation. Compared with the most prosperous year in the past, the amount of profit referred to is in no wise a humble figure. The postal service has, however, to make up the losses previously incurred. Now that private mailing offices are wholly abolished, the postal service may be said to be truly unified.

With regard to telegraph service, there has been during the past two years a certain amount of success in its reorganization with a corresponding amount of improvement in the service. But as the financial condition of the service has never been sound and furthermore as there are old debts to be amortized though they have all been readjusted, it is not yet in a position to carry out a program of extension on a large scale.

As to navigation, credit should be given to the China Merchants' Steam Navigation Company, whose trade has shown a marked increase. But for the present it has to surmount many difficulties due to various causes.

As far as commercial aviation is concerned, both the Eurasia Aviation Corporation and the China National Aviation Corporation have been able to extend the lines of their service as well as to cut down their administrative expenses to the minimum, thus making their receipts and payments balance each other. The China National Aviation Corporation is now showing rapid progress.

Now that the year 1935 has begun, may I take the opportunity to outline briefly what the Ministry undertakes to carry out during the year. In doing so, I shall revert from time to time to what has already been done for better understanding.

A.—Postal Service

The development of the Postal Service, in fact, hinges upon the development of transport media, such as railways, motor bus services, steamships, airplanes, etc., but the Chinese Postal Service, as hitherto, has its own basis for extension. The resolutions passed by the National Postal Conference held in September last will successively be put into effect. Among the measures that are in progress this year, the more important ones are as follows:—

1. *Rearrangement of postal districts and extension of Head Office authority.*—The existing Postal Districts, which were arranged according to the political, economic and communication conditions of former times, do not coincide with the present administrative areas. For instance, the Su-Wan (Kiangsu-Anhwei) Postal District covers too extensive an area, resulting in much inconvenience. Rearrangement of the present postal districts is necessary, in view of the improvements achieved in such matters as Public Roads, Railways, Aviation Services, Telegraphs, Telephones, etc., coupled with the housing of Post and Telegraph Offices in the same building which, introduced last year, makes it necessary for the Post Office administrative areas to correspond with those of the Telegraphs.

As regards the authority of the District Head Offices, the power of the Postal Commissioner is so limited that expenditure of even a few dollars must be reported to the Directorate General of Posts for approval. This is not without unfortunate effect on postal progress as Commissioners are thus handicapped in the free exercise of their abilities, and as the Directorate's decision in some cases may not suit local circumstances and requirements. But rulings of this nature were introduced according to the conditions of former times, when postal business was still in its initial stage. Revised regulations extending the authority and functions of the District Head Post Offices are now under discussion, by which all ordinary matters may be settled locally, and other projects belonging to each district should be first studied and rendered in detail by the District Head Office concerned, so that the Directorate General of Posts may fully devote itself to its guiding and supervising duties instead of being overburdened with trifling matters.

II. Extension of Postal facilities in the interior and opening of additional establishments.—The necessary reorganization and extension are to be made at many places in the interior where postal establishments are poorly equipped and where the surrounding villages are not postally served. Now all Min-hsin-chu or private mailing offices were closed at the end of last year. Although the District Head Post Offices in various provinces have since opened

Third Class Offices or Agencies at many places in the interior to cope with the new situation, and have undertaken to deliver mail matter for non-postally-served regions free of charge, more mail lines and new Post Offices should be established to answer public requirements.

III. Extension of mail lines in frontier provinces.—The principle hitherto followed in opening postal establishments is that the new establishments should be self-supporting. However, in the interest of culture and education for people in the frontier provinces, mail lines are to be created or existing services extended, regardless of losses. Take the postal service of Sikang for example : the Western Szechuen District Head Post Office has already deputed representatives to take the matter in hand and Kangting or Batang will in future be selected as the seat of a District Head Post Office or First Class Office for that area, which is to be under the direct control of the Directorate General of Posts. At the same time, steps are being taken to extend the postal service for the whole of Tibet, and a District Head Post Office will be established at Lhasa. Negotiations are being conducted with the Tibetan authorities on this project which will perhaps materialize in a few months. Further, in view of the vastness of Tsinghai's area, a District Head Post Office or First Class Office at Sining will also be necessary.

IV. Construction of office buildings.—Besides more than 10,000 agencies, there are over 2,300 Post Offices throughout the country, of which only over 80 offices are Service-owned property while others are all housed in leased buildings. Naturally, these leased offices cannot be expected to suit the purpose ; steps have therefore been taken since last year to construct buildings for the Nanchang, Changsha, Chengtu and Wuchang District Head Offices and for the Wuchang and Ichang First Class Offices. Plans are also set on foot for the construction of Service buildings for the Kiukiang, Wuhu, Chengchow, Shasi, Batang, Sinning and other important offices, and it is expected that they will be completed in the course of the present year.

V. Management of P.O. Savings Deposits.—The total of the P.O. savings deposits has advanced from over 18 million dollars (figures for the winter of 1932, the previous record total being over 21 millions) to more than 37 million dollars, in spite of the acceptance of deposits being restricted, or even suspended in certain districts, owing to the difficulties in making investments. In view of the unsettled condition of the money market, and in the interest of depositors, investments have been rigidly restricted since the year before last : a large portion of the saving funds has been deposited with reliable banks while the balance has been accumulated in cash. Therefore, during the recent financial crisis, the Post Office Savings Bank has not been affected at all. But, as the P.O. savings deposits come from the people of various places, they should not be accumulated only in large centers. Special attention is now paid to loaning funds to the farming population, so that these people may be benefitted on the one hand and that no risk is run on the other. To this end, a system was tentatively started by the Hunan District last year to designate a certain amount of capital for making local investments and arrangements were also made with the Kiangsu Farmers' Bank whereby a certain amount of capital was entrusted to the latter to be loaned on its own responsibility to the rural communities. Some other districts will also be selected to experiment with these systems this year.

VI. Introduction of the System of transfers of postal savings account.—The outline of this system is this : A depositor may open a Transfer account with a certain amount of money and the Post Office allots a serial number to his account. Any person at a place with the Joint Pass-book Savings privilege, who has to make payments to the above depositor, may hand the money to the Post Office to be credited to his account, and the Post Office will then notify the depositor of this transfer, who may either withdraw the amount at any time or send in his pass-book to be written in. The Post Office charges only a nominal fee for this service while the public may enjoy great convenience.

If the person who makes the payment has also a Transfer account with the Post Office, the formality will be even simpler as he need only tender his pass-book to the Post Office, asking it to effect the transfer without tendering ready money.

This system is in operation in various countries. Introductions were repeatedly issued by this Ministry last year to make the necessary preparations for its introduction which is, however, attended with difficulties because of the complicated standards of currency, and the consequent varied rates of exchange, prevailing in this country. Now that the necessary preparations have been completed in principle, the system will be introduced in the Chekiang, Su-Wan, Shantung, Hopeh, Peiping and Shanghai Districts this year as an experiment before it is gradually extended to others.

VII. Introduction of Post Office Life Insurance.—This system will afford the poor people an appropriate means of protection for their livelihood and encourage them to form the habit of thriftiness. The premiums received may be appropriated, as an investment measure, for the development of local public enterprises, whereby the society—especially the common people in general—will receive the benefits directly or indirectly. This has long been in operation in many foreign countries, being either undertaken by commercial organs or the Post Office. In Japan where it is operated by the Post Office, the business is very prosperous. While the maximum amount of insurance is limited to $450 the total premiums are now said to have come to a sum of over Y.2,000,000,000, much to the benefit of the nation and society.

The Ministry has worked out a formula to introduce this system into our country, which is now under study by the Legislative Yuan and will be published shortly. The maximum amount of insurance is provisionally fixed at $900. Beginning from the next month, a group of employees will be trained to deal with this branch of postal work which will be started this year at Nanking and Shanghai for trial and will then be gradually extended to other places.

VIII. Purchase of books, and subscription to newspapers and other publications through the Post Office.—In order to promote learning and education and to facilitate the purchase of books, etc., by the public, the Ministry has formulated various regulations by which books and newspapers and other publications may be purchased through the Post Office. The subscription service commenced in April, 1934. This year, a general catalogue of books that can be purchased through the Post Office has been compiled and the purchasing service began from the last month at all Post Offices. It may be mentioned here that the present organization of the publishing trade in this country is not yet the most healthy one and that, generally, each publishing firm deals in its own books only, which, coupled with the troublesome procedures in remitting money, causes much inconvenience to purchasers, especially to those at inland places. This greatly retards the development of civilization. As books may now be purchased through the postal channel, there will be no inconvenience at all. Improvements will be made in these services whenever necessary.

IX. Compilation of Postal Atlas.—The third edition of the Postal Atlas published at the end of the year before last was a revised edition of the previous issue. The Atlas shows more clearly than before as regards the boat, railway, motor bus, airmail and telegraphic lines. However, as the work was done by the staff of Post Office, all these maps record chiefly the postal establishments and mail lines, but are very incomplete in regard to physical and political geography ; besides, there are some discrepancies. Further, some hanging postal maps were printed as far back as in 1921 and are, therefore, not quite suitable for present use. In view of this, the Ministry sent an expert to the Directorate General of Posts last year to co-operate in the revision work and in drawing new maps ; the Land Surveying Bureau and Geographical Association were also requested to render their assistance. It is expected that the new maps will be ready for the press in June or July.

X. Census-taking.—The Post Office has hitherto taken interest in census-taking and the results of its findings have been published. Last year the Ministry sent statisticians to the Directorate General of Posts to map out plans for a fresh census to be taken by the Post Office. It will probably be completed in the coming Autumn.

B.—Telegraphs and Telephones

Definite progress has also been made in the field of telegraphs and telephones. In order to give some examples, we may mention the Government International Radio Station at Shanghai, of which the average monthly revenue reached the respectable figures of three hundred and thirty thousand dollars ($330,000) in 1934 as against the average monthly revenue of one hundred and fifty thousand dollars ($150,000) in 1932, and also the Telegraph Office and the Radio Station at Shanghai, of which the average monthly revenues have risen from one hundred thousand dollars ($100,000) to one hundred and seventy thousand dollars ($170,000). Besides, best use has been made of old materials, instruments, poles and wires which had been almost lying wasted. Of course we just admit that although great efforts have been exerted to bring about improvements, it is still too early to say that Chinese telegraph and telephone systems have been completely modernized. In September 1934, a Ministerial Conference on Telegraphs was held and a number of resolutions were passed. These resolutions are being successively carried out. The following are what this Ministry has decided to do within the current year:

(1) *Completion of all important long distance telephone trunk lines in the country.*—Since the establishment of the National Government, certain provincial governments have taken up the construction and operation of long distance telephones within their respective provinces. This caused a divergence of view between the Ministry of Communications and the Provincial Governments. To remedy the situation, the Ministry worked out a plan by which the provincial government may be entrusted by the Ministry of Communications to install and operate long distance telephone systems within their provinces, so that the rapid development of this new means of communication might not be hampered, while the integrity of the Government telegraph and telephone systems will be kept intact. As a further step the Ministry adopted the important construction scheme of nine-provinces telephone trunk lines, which will afford direct communication between any two principal cities in Kiangsu, Chekiang, Anhwei, Kiangse, Hupeh, Hunan, Honan, Shantung and Hopei. The Ministry succeeded in securing the necessary funds and materials last year and the work of construction, which is now in full swing, is expected to be completed before the end of this year. With a view to facilitating communication with the North-Western provinces of China, the original scheme will be extended so as to cover Sian, Taiyuan and Lanchow. There was also a construction project of Kiangsu Provincial telephone network, forming part of the grand scheme, but it has been decided to transfer part of the materials intended for the Kiangsu project to Kiangsi and Fukien. Before the end of the current year the provincial telephone networks in the last mentioned two provinces will in all probability be completed. Besides, branch telephone lines will be installed in Anhwei and Honan, and trunk lines are being actually constructed between Wanhsien and Chungking. As to telephone communication between Chungking and Hankow, radio telephone stations will be installed to serve the purpose.

(2) *Expansion of the Government International Radio Station.*—The business of the Government International Radio Station has been rapidly increasing since December 1930, when its direct radio-telegraphic circuits with San Francisco, Berlin and Paris were opened. In 1934, the Shanghai-London and Shanghai-Tokyo circuits were inaugurated, and in January 1935, the Shanghai-Rome circuit was started, with the result that the traffic of the said station has increased by leaps and bounds. For the present year the Ministry is contemplating the establishment of direct radio communication with India, Australia and Canada. As the existing transmitting and receiving equipments will be evidently insufficient for the purpose, one or two sets of high-powered automatic transmitters and receivers will be purchased. Further, in consideration of the large amount of international telegrams from or to Tientsin, Tsingtao and Hankow, medium powered automatic transmitting and receiving stations will be set up in these places to communicate directly with such neighboring countries as Japan, Philippines, and French Indo-China. Thirteen transmitters of three-and-half kilowatt power each have already been ordered and will be installed in the various important towns, serving the double purpose of carrying on international service and of accelerating the transmission of inland telegrams.

During the past two years international radio-telephone communications in China have been emerging from the experimental stage into a commercial utility. The Ministry has obtained fairly satisfactory results in radio-telephonic testings made with the European and American stations by using a phone-transmitter installed in its International Radio Station at Shanghai. As soon as the required privacy and terminating equipment are shipped to China, commercial service will be formally introduced. This is expected to take place in the summer of this year. Moreover, a few smaller radio-telephone stations will be installed for communication with the neighboring countries. Sometime in May of the current year, the radio-telephone stations in Canton, Tientsin and Hankow will be opened to public service; these stations will be closely linked up with all the trunk telephone lines and local telephones, and their calls to or from abroad will be relayed by the powerful station at Shanghai. Following the completion of the Ministry's Station in Canton, Hongkong will be within telephonic calls of Shanghai. Lastly, twelve more radio-telephone stations will be installed in the inland or remote places of China, thus concluding the first stage in the development of national telephone network.

(3) *Adjustment of Local Telephone.*—Automatic telephones have been installed in such large towns as Nanking, Shanghai, Tientsin, Hankow and Tsingtao. For the sake of economy the old manual instruments of these places have been repaired and shifted to Soochow, Chinkiang, Nanchang where a telephone office was established last year as well as to Sian, where a local telephone system is under construction. As regards the private telephone companies in Lanchow and Ichang, this Ministry is taking steps to take them over and cause necessary improvements to be made. Moreover, the magneto telephones installed at Chefoo and Wuhu will be converted into the common battery system and have their numbers of stations enlarged. The telephone company at Chengtu will also soon be taken over by this Ministry with one thousand telephone stations of the common battery type to displace the original installation. Smaller offices with magneto telephones will be successively established in such places as Tungtai, Anyang, Hwaiyin, etc. All these are to be accomplished within this year.

(4) *Improvement in the Telegraph Service.*—During the past two years a number of telegraph trunk lines were overhauled and the telegraph instruments of the important offices were changed. During this year this will be done to the branch lines and smaller offices.

In order to diminish the number of words transmitted over the telegraph lines, this Ministry will effectively enforce the use of Service Codes, by means of which a single word may stand for several words, phrases or sentences.

Regarding meteorological telegrams, this Ministry is making arrangements with the organizations concerned with a view to safeguarding both correctness and speed of these telegrams.

The Telegraph Dictionary of Chinese National Phonetics has not yet been put into effect. Since the standard pronunciation of certain words contained therein has been altered after its publication, it is being carefully revised by the Ministry and a new service of Chinese National Phonetic Telegrams will be introduced within this year.

(5) *Expansion of the Workshop.*—The workshop for repairing and manufacturing telegraph and telephone materials, established at Nanking by this Ministry last year, has now been provided with the necessary equipment. It is intended to expand the said workshop this year. Investigations regarding the national demand for telegraph and telephone materials including those for military use, have already been started and the results of these investigations will serve as guidance in laying down plans for the gradual development of the said workshop.

(6) *Training of Personnel.*—Since the closing down of the Telegraph and Telephone School at Shanghai owing to unsatisfactory management, over three hundred telegraphists have either retired of old age or been dismissed on account of bad behavior. The gradual and steady development of the service and the rapid increase in the number of long distance telephones and local telephone exchanges taken over or newly installed by this Ministry, have created a large demand for personnel. Moreover, as the nine-province long distance telephone lines will be completed in the near future, a sufficient number of telephonists must be technically trained beforehand to meet the requirement. For these reasons, it is decided to establish a Training School at Nanking this year. Besides admitting candidates who successfully passed the entrance examination, selected employees among the present telegraph and telephone personnel will be taken into the School in turn.

(7) *Promotion of Publicity.*—Now that the telegraph and telephone systems of this Ministry are fairly well equipped and, as a result, communications are facilitated, more attention will be directed to the social and commercial news, to the spread of information concerning communication enterprises, and particularly to international publicity. In the various large towns, broadcasting stations will be installed. A 10 kilowatt broadcasting station at Shanghai is expected to be completed this summer. A Broadcasting Link covering the whole country is now being planned, which will undoubtedly have an important bearing on education and

culture. Effective measures to remedy the confused conditions of broadcasting now existing in Shanghai are being devised, and a Radio-electric Planning Committee, charged with the task of drawing up a complete scheme for the maintenance of order in the air as well as for the most advantageous distribution of radio stations over the country as a whole, will be set up within the shortest possible period.

C.—Marine and Navigation

Among the enterprises under the control of the Ministry that of marine and navigation is the most difficult to manage. As the right of inland navigation is being fettered by treaties, the administration of Marine and Navigation meets with obstacles on every turn. For instance, the restriction of foreign pilots, due to complicated conditions, is a matter still unsettled. Another handicap is the lack of funds. The income of the Bureaux from various sources is hardly sufficient to cover their expenditure. It is the intention of the Ministry, however, to lay a firm foundation for inland and coastal navigation in the immediate future and to gradually work toward the establishment of ocean service. The resolutions which were passed last May at the Navigation and Shipping Conference have been carried out one after another according to the degree of their importance. The outstanding activities of 1934 can be summarized as follows :

1. *The improvement of general administration.*—The reorganization which took place the year before last resulted in the abolition of all registering offices and the creation of three bureaux, namely, Shanghai, Hankow and Tientsin. These bureaux have under them stations at important ports. As the bureau at Canton has not yet come into existence, stations at Amoy and Foochow were established under the direct control of the Ministry. And the clause " waters leading to the sea " in the Marine Law is clearly defined to avoid any possible conflict with the local authorities.

In order to meet the demand for trained Chinese navigators, the Mercantile Marine College at Woosung was reopened in 1929 by the Ministry. Since then graduates of that College have not been numerous. But the number of students for last semester was increased to over three hundred. Every effort is being exerted toward its improvement and expansion.

Examinations for the master, mates and engineers who have been in active service, were held at four different times since June 1933, and successful candidates, including candidates who took examination at various times since last July, are well over one thousand and one hundred.

Other activities such as the survey of foreign vessels, the improvement in the management of ships, regulation for the safety and protection of passengers, the formation of an organization to arbitrate over marine disputes, etc., have been taken up in the past year and shall form a part of the program for the present year.

2. *The supervision of private shipping.*—To eliminate undesirable competition among shipping concerns and to unite them to increase their efficiency, the Ministry urged the shipping companies to form a co-operative society for shipping. A committee was formed to draw up plans for the establishment of the society. The committee was instructed to investigate existing shipping conditions, to collect statistical meterials and to map out plans for the shipping merchants to co-operate for mutual benefit. The Marine and Navigation Bureaux were at the same time instructed that pending the investigation of the Co-operative Society no ship was to be added to any of the existing lines unless by special permission. Now the Chinese Co-operative Shipping Society is being incorporated and plans of co-operation among shipping interests will materialize before the end of the present year.

3. *The development of the China Merchants' Steam Navigation Company.*—Ever since the China Merchants' Steam Navigation Company became a government enterprise, no efforts has been spared on the part of the Government to make it a success. The purchase of the four coasting steamers is a proof of the Government's intention. After prepayment of capital and payment of interest and deducting operating expenses and making provision for insurance as well as depreciation. The average monthly net profit of each of these steamers is about thirty thousand dollars. With the establishing of through bill of lading between land and sea, the Company's Northern, Southern and Yangtze lines can make connections with all railways. Seeing the importance of the Lung-Hai Railway, the Company established last year an office at Haichou to handle the through bill of lading traffic, with the result that the Company's income has considerably increased. The Company's wharves and godowns are spacious and advantageously located. Recently new godowns were built in Canton. The Company's buildings at Hankow, Nanking, Chenkiang, and Tientsin have been repaired and repairs have been also effected on the Southern, Yangtze and other wharves in Shanghai. Wharves at Swatow, Chenkiang, Wenchow and Changsha were also repaired. Consequently incomes from these wharves are increased. Plans for the rebuilding of Kin Lee Yuen, Yang Kah Du, Central, Northern and Eastern wharves have been made. As soon as funds for this purpose are available these plans will be carried out accordingly. The " sin ko " of the land along Kin Lee Yuen and other wharves has increased the value of the Company's properties to the extent of $7,500,000. Furthermore, offices at outports are required to change the old system of fixed income and in its place introduce the system of actual cost and report their profit and loss to the Head Office. This will increase the income of the Company considerably. The compradore system is being gradually abolished and instead of a compradore a purser is employed, who is under the direct control of the Company. This is being tried out on the new ships. If it is successful it shall be extended to all ships. It was customary for the Company to allow the outport managers a five per cent commission as an incentive to secure business for the Company. This was done away with during the current year. In addition to the above, smuggling of goods is strictly prohibited, particular attention is given to the sanitary condition of the passengers, for whose convenience no effort is spared. The income of 1933 increased 25 per cent as compared with the average increase of the four years from 1929 to 1932. The figures for the last half of 1934 are not yet available, but the income of the first half of 1934 increased 31 per cent as compared with the average income of the same period of the four years from 1929 to 1932. On the other hand, the debt of the Company is so heavy that the annual interest amounts to over two million dollars. Although the profit for last year amounted to over $400,000, this sum can only cover a small part of the enormous interest. Therefore, the most urgent at present is the liquidation of the debts of the Company. In view of the successful readjustment of all the obligations of the Telephone and Telegraph service, plans are being made for the speedy readjustment of the Company's indebtedness. The Company has been instructed to notify its various creditors to start discussions to that end. It is hoped that a settlement will be effected before the end of the present year.

The demand for ocean service is becoming very urgent and as the Company is a Government enterprise, obviously it is the Company's duty to undertake the task. But as the present financial condition of the Company will enable it only to carry on with its coasting and inland services, the proposed ocean service will have to be inaugurated in the not distant future. It is, however, the intention of the Ministry to increase the tonnage for coasting and inland services ; separate negotiations for the purchase of 24 ships, having an aggregate tonnage of 70,000 tons, were begun last autumn. They have been proceeding smoothly and if they should prove still more successful, most of these ships will be added to the different lines in the course of this year.

D.—Commercial Aviation

The lack of facilities of communication in many parts of the country makes commercial aviation an urgent necessity in China at the present day. But there will be little hope of development unless there are funds other than that portion now appropriated from the postal service.

The China National and the Eurasia Aviation Corporations are quite sound in their internal organization, and have always paid attention to the training up of competent Chinese pilots who must pass such a rigid test as is generally given to would-be pilots in foreign countries. Young candidates are now undergoing special training and it is hoped that during the year a class of competent Chinese pilots with more than 1,000 hours of flying experience may be enlisted for active service.

1. The China National Aviation Corporation is operating three lines, namely, the Shanghai-Szechuen, the Shanghai-Peiping and the Shanghai-Canton, among which the Shanghai-Szechuen line has made the greatest progress inasmuch as it has now taken

Chengtu as the west terminus. Plans have been drawn up for further extension from Chengtu to Patang,t hence to Lhassa, with the hope of bringing Sikang and Thibet within easy reach.

New planes will be put into service for the Shanghai-Peiping line this summer so as to make possible a daily trip each way. The Tsingtao-Weihaiwei line by way of Chefoo will also be started. The Shanghai-Canton line, when first put into operation last year, was not quite successful, owing to climatic variations along the coast. But plans for improvements were carried out before the line resumed service. The Corporation plans to increase the number of flights in the latter part of this year. Daily direct express flights from Shanghai to Hankow and *vice versa* will be put into operation very soon, and also special flight from and to the various stations of the line. Such flights will probably also be made in the Shanghai-Peiping and Shanghai-Canton lines in the latter part of the year. Measures for operating a Canton-Honai line are now under consideration, whereas the trial flights for the Chungking-Yunnan line have already been successfully carried out.

It is to be noted that exclusive of what was written off for the depreciation account, the Corporation's receipts and payments of the previous year balanced each other. It is calculated that this year there will be so much more profit as to need no further financial assistance, where is rarely seen in the case of the aviation corporations of other countries and is, therefore, most encouraging. A reduction of 20 per cent has been made in the passenger fares since last year and a further reduction of 20 per cent may be made beginning with the next year. New planes have been ordered and in May of this year the old ones now in operation in the different lines may be replaced.

2. The Eurasia Aviation Corporation has met with diverse obstacles ever since the establishment and therefore the original plan of direct flights to Berlin has never been carried out. In 1933 the Shanghai-Sinkiang route was opened, flying as far as Tahcheng via Urumtchi. But owing to the local unrest in Sinkiang, the route was soon cut short, now flying only as far as Lanchow as its west terminus. The Corporation, however, will extend the existing route to Ha-mi in April this year.

It is further planned to increase the number of flights in the latter part of this year in the Peiping-Canton, the Lanchow-Ninghsia and the Ninghsia-Paotow routes, all of which were put into operation last year. Plans for the Sian-Chengtu and the Canton-Yunnan routes so as to develop the facilities of communication in the North-west and the South-west respectively are now under consideration. Even direct routes from Yunnan to Rangoon are being studied.

Besides, as the passenger fares and freight charges in the aviation services are still too high for the present economic conditions of our country, the Corporation has reduced both of them by 25 per cent. beginning with the last month.

E.—Accounting System

Accounting necessarily occupies a very important place, in view of the fact that the Ministry has under its control such services as Post, Telegraph, Navigation and Commercial Aviation. In the early days of my administration, special attention was given to this matter. And since then, foreign and Chinese chartered accountants have been sent at stated intervals to all the important subordinate organizations to check their accounts and some of them have been stationed there to do the work of auditing. Besides, inspectors of account books have been appointed and detailed to the subordinate organizations to inspect their accounts and to render them assistance. As the creation of Chief Accountant's Office in the Ministry was under contemplation when I assumed the post, I did what I could to hasten its advent. I am now glad to say that under the supervision of the Comptroller-General's Office, independent accounting has become a reality in this Ministry.

1. *Government Accounting.*—All the books, statement sheets and other accounting tables of the Ministry are drawn up in accordance with the United Government Accounting System as promulgated by the National Government. All payments and receipts of the Ministry are transferred through the National Treasury according to the procedure governing the centralization of Revenue Receipts and Expenditure of the National Treasury. Ever since this was put into practice, accounts have been entered and statements compiled and submitted at the right time, and it may be safely asserted that the proper procedure for payments and receipts of the Ministry has always been followed. As regards the accountancy matters of the various organizations under the control of the Ministry, experts have been sent to inspect and to give necessary directions in these matters so as to make them conform to the United Government Accounting System. To ensure the proper enforcement of the system, a ruling has been made that in case of failure to compile and submit statements at the right time, the monthly allowances for the subordinate organizations concerned will be automatically suspended. In a word, desirable results in controlled accounting have been actually obtained.

2. *Business Accounting.*—The accounting of the Post Office has been able to conform to the principles of business accounting. On the other hand, the accounting of the Telegraph and Telephone service has always followed the customary practices of government accounts: no further responsibility to be borne by the administration once their accounts are submitted and approved. So no business accounting in whatever form can be found with their accounts. As regards the accounting system of the China Merchants' Steam Navigation Company, it was never perfect, but it is now being modified and improved. The accounting conditions of the China National Aviation Corporation and the Eurasia Aviation Corporation are quite satisfactory.

From what is said above, there is more urgent need of improvement in the accounting system of the Telegraph and Telephone service and in that of China Merchants' Steam Navigation Company than in the Postal service. The Telegraph and Telephone service having a larger sphere of activities, is much more complicated and its accounting system is to be first reorganized. To this my predecessors have also paid attention. In 1930 regulations governing the accounting of the Telegraph and Telephone service were formally promulgated, but somehow or other they were in most parts never carried into effect. So in 1933 a committee for the improvement of the accounting of the Telegraph and Telephone service was specially organized, regulations were drawn up, and definite forms and examples compiled and referred to the various offices for practice. The amended system was approved by the Comptroller-General's Office and formally put into practice in the latter part of last year, while experts were sent to the various offices to give the necessary directions. I am happy to say that all the telegraph and telephone offices of the country have now adopted the new accounting system, and it is hoped that a general balance sheet for the telegraph and telephone service of the whole country may be drawn up in due time. Another committee is being organized for the further study of the accounting of the Telegraph and Telephone service. At the same time it is deemed necessary that in order to carry out the spirit of independent accounting the staff of the Accounting Department should not be affected by any change of the Minister. Consequently, in the first part of last year, an examination was held for the selection of the members of that staff and the successful candidates were subsequently assigned to various offices under the control of the Ministry. In short, ever since the Ministry and the organizations under its control (including the Telegraph and Telephone service) adopted and followed the various regulations promulgated by Comptroller-General's Office, there have been noticeable results in accountancy matters during that short space of time. It may be added that in various departments mechanical accounting has been introduced.

This year we plan to systematize the accounting practices of the Postal and the Navigation services so as to secure absolute independence in accountancy matters and to bring them under the direct control of the Ministry. We also plan to publish books and pamphlets on communication accounting for the reference of those who serve in the accounting offices of the various subordinate organizations. Besides these, such matters as the training of the accounting staff and the examination for their selection, which have a great deal to do with the carrying out of the United Accounting System, will be dealt with step by step, as occasion demands.

Following the policy of the Government and enjoying the whole-hearted support of my colleagues and staff, I have been able to carry out many of my plans, although the results still fall short of our hopes and expectations: but communication enterprises have long been in a parlous state, and, under the present financial conditions of this country, the only way to improve and expand

(Continued on page 94)

Manchuokuo and the Open Door Policy

By K. S. INUI, LL.D.

I.—The Meaning and Evolution of the Open Door Policy

A NOTE of uneasiness is freely expressed in many quarters regarding the Open Door Policy in Manchuokuo. This loudly heralded and highly inflated principle in this part of the globe owes its origin to China's delinquency, which prompted Secretary Hay in 1899 and the nine Powers in 1922 to come to agreements with or over this Republic without any reference to her likes or dislikes. The agreements have, roughly speaking, undergone three stages of evolution.

First Stage.—The agreements, as they were originally conceived, were negative in purpose and character. They were the outcome of the circular notes of Secretary Hay who hoped not so much to put a stop to the scramble for concessions, then going on among various powers which claimed their spheres of interest or influence, but to secure the equality of trade opportunities for American nationals in these spheres. The notes thus exchanged, of necessity, recognized the *status quo* of then existing vested rights or already acquired interests. At this stage, the arrangements were among the powers excluding China. Hence, she was neither responsible for them nor was she able to claim any rights thereby. The boundaries of application of the policy wese naturally limited to these spheres.

Second Stage.—This was ushered in by the Nine Power Agreements of 1922. They were prompted not so much by the thought of checking discrimination in these spheres, which were fast becoming obliterated, but by the idea of "effectually establishing and maintaining the principle of equal opportunity for the commerce and industry of all nations throughout the territory of China." The Agreements furthermore counsel in a positive manner "to provide the fullest and most unembarrassing opportunity to China to develop and maintain for herself an effective and stable Government." Even here, it is clear that they do not stand so much for positive assistance as for negative restraint. But this much of evolutionary changes must be recognized, namely, that the confine of application of the agreements was extended to the entire territory of the Chinese Republic and that China, not only in interest but legally, became a party to certain rights and obligations by virtue of these agreements.

Third Stage.—With the temporary growth of the idea of liberalism and equality of opportunity as the result of the Washington Conference, and with the parallel development of the identical principles in the League of Nations circles, the term open door has come frequently to be used to mean a phase of the so-called "equitable treatment of commerce," of which Japan has been a conspicuous advocate. "With the disappearance of those spheres of influence," said Ambassador Hirosi Saito speaking before the Foreign Policy Association in New York on January 5, this year, "the open door policy has become the synonym of equality and justice in commercial relations among all nations" and not as a policy between the strong over the weak as was the case in the first and second stages of its evolution.

Whatever might have been the phraseology, one outstanding fact is that the Open Door Policy is merely a Chinese edition of its counterpart of sad experiences in Africa of contests and rivalries for exploitation by the European Powers. It is the doctrine advocated and insisted upon by a late-comer to a new field of contest. It is actuated by more or less the same spirit that prompted earlier arrivals to ensure their interests by the most favored nation clause. But, because it was feared that even the most favored nation clause between China and an interested party would not operate within these spheres, the open door policy was transplanted into the semi-colonial atmosphere of Asia from the colonial climes of the African continent.

Originally in China, the open door policy, besides the negative restraining features above referred to, was intended positively to afford an equality of opportunity in matters essentially economic and tariff in particular. But there, because of the existence of extraterritoriality which is so intimately interwoven with political aspects of international relations, besides the political consideration above referred to, the scope of application of these principles has become extremely elastic. However, in the last state of development of the open door principle, once more political significance is fast receding in favor of the purely economic. So much so that the time honored phrase is now being used among the members of the League of Nations as meaning equality or equitable treatment of one another confined to matters economic.

II.—The Open Door Policy and Manchuokuo

Now the question arises as to what extent and in what manner is Manchuokuo responsible, if at all, to the Open Door Policy. It is only natural that there exist at present two interpretations or contentions as to the extent of Manchuokuo's obligations. The gap lies between those who recognize and treat Manchuokuo as a distinct entity and those who look at the Manchurian realities with the Geneva reasoning and an ostrichian logic and consider the New State still as part and parcel of China.

The latter approach may not be without some legal ground if the endorsement of a majority makes a matter more legal and right. But, unfortunately, this contention is so far from the hard facts as they exist to-day, that the two do not synchronize. Their discussion may be interesting as well as of great import. But it is the writer's purpose to put forth merely the average realistic Japanese or Manchuokuoan viewpoint in the present article.

Whether Japan's arms helped the dissatisfied Manchurians to rise spontaneously against, or timidly to fill the vacuun left by the collapse of the cordially disliked Chang dynasty, is now largely a question of academic speculation and interest. The child is born and cannot and will not return to its mother's bosom again. Even admitting frankly that the Japanese influence over Manchuokuo is no small one, unless something unforeseen takes place, it seems a well-nigh unanimous and settled policy of Japan that the new born state will be helped, at any sacrifice, to attain its full growth. Indeed, Manchuokuo is fast assuming the stately proportions of a nation, exhibiting its unquestionable and undeniable determination as well as capacity for that self-same existence.

Now that Manchuokuo is a grim reality, aspiring to attain those attributes of a sovereign state, whether the practices of the Open Door in her domain will copy the relic of those agreements made to order among the Powers over more modest and backward countries in Africa or China of two or three decades ago, or whether they shall follow those of more progressive and autonomous states, is of course a matter of primary importance to the new state and is, at the same time, a concern of some magnitude to the chancelleries of principal capitals of the world.

In this connection, a word or two as to the place of Manchuokuo as a new national entity is interesting. Says Lawrence in his "Principles of International Law," "Even though the conception of the rights and obligations of a succeeding state was derived from the Roman Law idea of *Corpus Jurist Civilis*, a successor state never occupies the exact legal position as its predecessor." "Revolution," contends Borchard in his Diplomatic Protection of Citizens Abroad, "represents *ab initio* a changing national will." No less definitely holds Oppenheim that "Nobody ever maintained that on the successor devolve all the rights and duties of its predecessors." These are the theories so obvious and recognized. It is, therefore, now generally conceded that political obligations are not usually transferred to the seceding or succeeding state.

It is largely in matters economic that a succession or revolted state may be held responsible. Even here, authorities are not agreed as to whether they cover the entire length and breadth of economic fields. Indeed, the majority of authorities seem to take a restrictive construction and in the field of public or private debts alone do we find any definite outline of the trends of opinions. Even in this most narrowed-down point, we do not have an absolutely unanimous acceptance, nor is it easy to ascertain the apportionment of indebtedness between the parent and succeeding states, or between the various divisions.

In 1898, for instance, the United States refused to burden itself with the public debt charged on Cuba by Spain, nor would she allow the Cuban Government to be saddled with it. No Russian debt passed on to Japan with the session of the southern half of Saghalien to Japan. Thus the conclusion of Borchard seems to be clear that a territory in passing to or establishing another "leaves behind one network of international rights and duties . . . . . . All it can be said to take with it are its local rights, local obligations and local possessions."

For the sake of completeness and in fairness, this much might be added that if any acquired or vested rights of persons, firms or organizations were greatly jeopardized, it is now generally believed that they are entitled to compensation. If such happened to be the case with the foreign oil companies in Manchuokuo, this course of remedy is open to them.

The latest tendency, in this connection, is that the nations are ready to grant national treatment, namely, treatment equal to that accorded to the nationals of the country save certain exceptions which are again universally recognized. Such treatment as described above is often given whether one belongs to a treaty or non-treaty power or not. But it is accorded on sufferance not as a matter of right. There is no question but that Manchuokuo would undoubtedly be ready to recompense any material damage to the vested rights sustained by the foreign oil interests.

It is true that Manchuokuo affirmed her adherence to the Open Door Policy when she declared on March 12, 1932, "That with regard to the economic activities of the peoples of foreign nations within the State of Manchuria, the principle of the Open Door shall be observed." But it must be remembered that she, as an independent entity, is the author of the policy—and the world must look to her for its own interpretation as to what she meant by the Open Door Policy.

Certainly it cannot be said that she is using the phrase in the sense as it was understood in the first stage. For China herself, much less Manchuokuo, as such, was not a party to the arrangements which call for any declaration, such as made by the new state.

Suppose then, the open door principle as contained in the Manchuokuo declaration was used in the sense as employed in the Washington Treaty among the nine Powers. We note by its construction, "the open door principle" and "the equality in China for the trade and industry of all nations" were considered equivalent by the conjunction "or" between these two expressions. And the equality for the trade and industry of all nations in a given country is becoming more and more clear by the recent deliberations in economic conferences in Geneva and elsewhere. Certainly no nation can legally assume that its nationals should enjoy a national treatment in Manchuokuo especially in the absence of such a treaty, even though she generously accords to all foreigners as many privileges as she is judiciously capable of doing as an independent nation.

No foreigners, except the Japanese are entitled to any right based on the firm foundation of a treaty. Even Salvadorians do not enjoy any treaty rights, though their Government has already recognized the new Empire, inasmuch as it has not yet concluded any treaty of commerce with Manchuokuo. From this line of reasoning, all others are merely enjoying the privileges by grants or on sufferance—much less as rights accruing from the Nine Power Treaty or the operation of the most favored nation clause.

Manchuokuo's Foreign Trade in 1934

By CHARLES BISHOP KINNEY

An official report, issued by the Department of Finance of the Manchuokuo Government, gives the 1934 (entire year) returns of the foreign trade of this new state. An unfavorable trade balance is shown, as the state imported M.Y.593,562,248 worth of goods and exported M.Y. 448,426,567, leaving an imported excess of M.Y.145,135,681. This unfavorable trade balance is due to many causes, but the most important fact to remember, at present, is that Manchuokuo is primarily an agricultural and not an industrial country. The construction program of the government calls for such goods and material that cannot be obtained from her own sources and must be imported. There are, without doubt, few countries in the world, if any, that are actually carrying out a construction program as huge as that of Manchuokuo.

When one considers the common maxim that the countries which sell should also buy, the United States of America has been especially fortunate in the case of Manchuokuo as she has sold to that country far more than she has purchased, the amounts being as follows: exports to Manchuokuo M.Y.35,227,096, imports from Manchuokuo only M.Y.5,966,010.

China and Germany formerly imported most of Manchuokuo's agricultural produce, and are still included as leading buyers, but the amounts imported by them now are very much smaller than what they purchased years ago. China has a grievance and Germany wants Manchuokuo to purchase more German manufactured articles to equalize the trade balance, which has been unfavorable to Germany for many years. Other nations, having unfavorable trade balances with Manchuokuo also desire equalization of trade with the new state. These difficulties would cause any country to re-examine the trade situation and to make plans that would be agreeable to both the importing and exporting countries. Besides this difficult situation, Manchuokuo has had to contend with two serious disasters since her foundation, in the nature of floods (the first in 1933, and the second in 1934), which caused great damage to crops. It is, therefore, not surprising to learn that Manchuokuo's trade balance has been unfavorable during the year, 1934. Present indications show, if one follows the construction program of the Manchuokuo government and private interests, that for a few years yet, Manchuokuo must be prepared for unfavorable balances of trade. China and Germany and other countries may buy more, but whether this will off-set the unfavorable balances, remain to be seen.

The following table shows the imports and exports of the foreign trade of Manchuokuo, for the entire year of 1934 (from January 1 to December 31), and also, for comparison, that of 1933:

(1934)	*Exports*	*Imports*	*Total*
Japan	172,262,488	383,295,990	555,558,478
Korea	46,412,901	25,305,456	71,718,357
China	65,694,407	57,594,562	123,288,969
Russia	8,423,177	4,875,768	13,298,945
Hongkong	6,848,584	3,596,674	10,445,258
British India	645,539	23 943,526	24,589,065
Netherlands India	1,709,509	6,694,905	8,404,414
Great Britain	16,218,009	9,315,948	25,533,957
France	2,921,120	564,780	3,485,900
Germany	53,310,482	12,485,641	65,796,123
Belgium	1,190,409	703,813	1,894,222
Netherlands	8,072,693	388,062	8,460,755
Italy	4,303,261	701,676	5,004,937
U.S. of America	5,966,010	35,227,096	41,193,106
Other Countries	54,447,978	28,868,351	83,316,329
Total	448,426,567	593,562,248	1,041,988,815

(1933)	*Exports*	*Imports*	*Total*
Japan	172,950,334	313,696,123	486,646,457
Korea	30,358,002	26,066,481	56,424,483
China	55,257,516	79,821,389	135,078,905
Russia	12,917,679	7,567,693	20,485,372
Hongkong	6,213,682	8,005,921	14,219,603
British India	1,080,464	14,702,830	15,783,294
Netherlands India	4,044,653	3,324,029	7,368,682
Great Britain	8,792,711	7,190,266	15,982,977

(1933)	*Exports*	*Imports*	*Total*
France	2,546,202	779,322	3,325,524
Germany	66,357,154	10,577,129	76,934,283
Belgium	280,631	1,291,087	1,571,718
Netherlands	5,910,454	427,414	6,337,868
Italy	1,847,256	459,052	2,306,308
U.S. of America ..	7,536,057	28,961,778	36,497,835
Other Countries ..	47,696,347	12,816,564	60,512,911
Total ..	423,789,142	515,687,078	939,476,220

It will be seen from the above figures that Japan leads both in imports and exports to and from Manchukuo at the favorable ratio of approximately 2.23 to 1, and practically one half of the entire foreign trade of Manchukuo (including both imports and exports) is in the hands of the Japanese. In comparison with 1933 Japan remains about the same as far as percentage of the entire trade is concerned. Japan exported more to Manchukuo in 1934 than she did in 1933, but the same can be said of the British Empire and especially the United States of America.

In connection with the increase of Japanese trade with Manchukuo, one must consider that the Japanese population which consumes Japanese goods, such as food-stuff, clothing, etc., is much larger than the American and European population in Manchukuo. American, British, French and German nationals total less than 1,200, while the Japanese number approximately 310,000. That Japanese builders and contractors, who are constructing most of the public works in Manchukuo, and who, incidentally, are furnishing the bulk of the money therefore, should use mainly Japanese materials, may hardly be considered a unique phenomenon, especially in these days when various countries are busily constructing barriers against Japanese imports. It is also usual for foreign nationals undertaking such work in China to show a similar preference for materials from their own respective countries.

Yet, the South Manchuria Railway Co., an entirely Japanese concern, in which the Japanese government owns a half share purchased directly from the United States of America, during its fiscal year (April 1 to March 31), 1933, goods to the amount of Y.5,639,316 or 4.7% of its total purchases from all sources. During the first ten months of its 1934-35 fiscal year, the South Manchuria Railway Co., purchased directly from the same country, goods to the amount of Y.4,150,503, or 4.5% of its total purchases from all sources.

America, however, greatly improved on her trade with Manchukuo. The United States of America had a favorable balance in 1933, the ratio being approximately 3.85 to 1 but in 1934 the ratio rose to about 6 to 1 in favor of the United States, America exported more to Manchukuo in 1934 than she did in 1933 and bought less from Manchukuo in 1934 than she did in 1933. Even with this improvement, and admittedly a great improvement in comparison with other nations trading with Manchukuo, it is not unnatural that the government at Hsinking wonders why American officials and men of national prestige as well as many journals continue to howl that Manchukuo with Japan's aid has closed the "open door" to foreign trade in Manchukuo. America has always had a favorable balance in her trade with Manchuria and now with Manchukuo. Since 1932 American trade with Manchukuo has been steadily improving. If American trade should decline in the following years, America will have to bear the blame, for Manchukuo has found out that nations are becoming more and more nationalistic. These prefer to trade with countries who buy their products, a sort of an exchange or barter system. Germany for years, has had an unfavorable trade balance with Manchuria, now Manchukuo, and her business men have already given notice to Manchukuo that less soya beans will be purchased, unless Manchukuo buys more from Germany. This system, can work equally well with all nations, including Manchukuo.

American officials and many business men in the Far East have predicted that American trade with Manchukuo would never reach the high figure of 1929, when Manchuria was ruled by Marshal Chang Hsueh-liang. They based their prediction on a flimsy pretext that Japan would close the "open door" to American and European trade.

Yet, the 1934 trade returns between the United States of America and Manchukuo show that America had a more favorable balance than she had in 1929. One may compare the figures for the year 1929, when world trade was good, with those of the year 1934, as follows:

	Imports to Manchuria	*Exports to Manchuria*	*Total*
1929 (Unit: Haikwan taels) ..	25,890,078	10,258,179	36,148,257
1934 (Unit: Manchuokuo Yuan)	35,227,096	5,966,010	41,193.106

It must be remembered that the Haikwan tael is a somewhat larger unit than the Manchuokuo yuan (roughly 1 Yuan=Tael 0.70). If one, for comparison, uses the Haikwan tael for the 1934 trade, it becomes as follows:

1929 (Unit: Haikwan taels) ..	25,890,078	10,258,179	36,148,257
1934 (Unit: Haikwan taels) ..	24,658,967	4,176,207	28,835,174

The favorable trade balance in 1929 amounted to Taels 15,631,899. In 1934, however, the trade balance became more favorable to the United States than in 1929 as witness, Taels 20,482,760. This is due to an increase of American exports to Manchuokuo over 1933, and to the smaller amount of purchases she made in Manchuokuo in 1934, in comparison to 1933.

One need not go into much detail regarding indirect purchases, as, for instance, from importers of American goods, such as the Mitsui Mitsubishi and other large private Japanese companies, which must amount to a fairly large total. It is, however, impossible to obtain figures in this matter.

There are some persons who claim that a considerable amount of American goods were re-exported from China, as Chinese goods (for instance, from Shanghai), to Manchuria during the years when Marshal Chang Hsueh-liang was warlord of Manchuria. But the same can be said now of American goods which are re-exported from Japan to Manchuokuo. China and Japan have import duties, but China has now established (since the birth of Manchuokuo), an export duty on goods which are shipped from Chinese ports to Manchuokuo. Thus, American goods arriving in China must pay an import duty to China, and if the same goods are re-exported to Manchuokuo, an export duty is also levied by China, and naturally these same goods on entering Manchuokuo, must pay another import duty to Manchuokuo. Thus indirect American trade from China to Manchuokuo died a natural death. No one is to blame for this, except China herself, and foreign manufacturers must be aware of this and note that this indirect trade is done through Japan now instead of China.

Great Britain's trade with Manchuokuo did not improve, as she bought approximately twice as much from Manchuokuo in 1934, as she did in 1933, while her exports to Manchuokuo rose slightly in comparison to 1933. If, however, Hongkong and British India are added to Great Britain the British trade with Manchuokuo shows a favorable balance, the ratio being about 1½-1. Great Britain's trade with Manchuokuo may improve on account of the visit to Manchuokuo last summer of a group of men, representing the Federation of British Industries.

It should be noted that China stood second among the countries exporting to Manchuokuo, although her Manchuokuo trade balance was unfavorable. This is not an improvement in comparison to her exports in 1933, but it is interesting to note that Manchuokuo sold more to China in 1934 than she did in 1933.

Atlas of China in Revised Edition

A revised edition of the China Provincial Atlas and Geography, published by the *North-China Daily News* is a most valuable work of reference that has just been brought out. Like the initial edition the new volume is cloth-bound, 10½ × 12½ inches and in its sixty pages it presents maps of every province in China accompanied by descriptive matter and many well-chosen illustrations.

In the new edition a number of revisions have been made both in the maps and in the accompanying text, in addition to which a map of China is included showing the principal boundaries, rivers, railways and air routes in colors. Much new and important information since the date of original publication about a year ago.

From the index of the Atlas giving more than a thousand references it is seen that the volume is as much a handbook as an Atlas, for subjects that are dealt with include: "Areas and Population," "Climate," "Racial Types and Language," "Physical Characteristics," "Communications," "Industries," "Foreign Representation," etc. The price of the Atlas remains the same—$6.

The Russian Factor in China

Ambassador Saito Tells American Audience Japan Desires to Safeguard Security Against Menace of Communism

(Following is the text of an address delivered by Ambassador Saito before the Council of Foreign Relations in Chicago).

* * *

It is always a great pleasure for me to come to Chicago, this great metropolis of the interior of the United States. Your city has a character distinctly its own. It is different even, from the other cities of your country, different from those of the Eastern, Western or Southern states. Though all are definitely and unmistakably American, each section of your country has its own peculiar characteristics. This is natural because of the vastness of your territory, which is an enormous empire, almost as large as all of Europe combined. Here in Illinois I feel I am at the heart of this extraordinary empire.

When a foreigner hears an American speak of the danger to his nation of attack from abroad he can but think that this man does not realize his country's size and unique strategic position—that he does not understand the important part that geography holds in international affairs. The United States is separated from Europe by an ocean that the fastest vessel cannot cross in much less than five days, and it is separated from Asia by an even wider ocean.

It is true that remarkable progress has been made by man in cutting down the barriers of time and space, but he has not yet mastered these nor is he likely to do so to the extent that the United States can ever be imperiled. Not unless your country degenerates and disintegrates internally could it be endangered from without. Few if any other nations of the world are so remarkably endowed. For more than a hundred years your territory has not been invaded. In this country, except in the case of your Civil War, every war that you have waged has been on foreign soil.

My country, too, has fortunately been free from invasion. But our position has never been so secure as yours. Geography has not been so generous with us. From the day that your Commodore Perry invited us to open our doors to foreign intercourse down to recent times, our people have had to make serious sacrifice to insure the safety of their land. They have seen the encroachment of Western powers on Asiatic territory all about them—by Great Britain, France, Germany, Russia and even the United States.

Many Americans do not seem to realize the extent of the insular possessions their country has acquired in the Pacific. Away from your mainland you possess in effect two chains of islands stretching across that ocean. From Alaska on the north the Aleutians stretch to the shores of Siberia, and from the Hawaiians on the south your islands of Midway and Guam form a line of stations to the Philippines.

Cites Aggression of Western Nations

When from time to time Western nations have shown anxiety regarding Japan it has been that we might deprive them of some of their Asiatic possessions. It has never been—not seriously—that any of them feared we could possibly endanger their homelands. But this has not always been the case with Japanese. Our people, until comparatively recent years, have felt the menace of Western aggressions in proximity to our shores.

It was only thirty-one years ago that the Russia of the Czar maintained a powerful naval base on the north Pacific, overran Manchuria with troops and threatened to take control of Korea, which is only across a strait from Japan. And it is only eight years ago that Soviet Russia attempted to dominate the affairs of China, our colossal near-by neighbor. The war between the Communists and the central government of China that has been going on since 1927 is the result of that Russian attempt—when not only propagandists and political agents but also military leaders were sent from Moscow to southern and central China to direct the revolution in that country.

Is it unnatural, therefore, that Japan should take measures looking to her own security ? Wouldn't any other nation similarly placed take similar precautions ? Suppose there were a colossal empire to the south or north of the United States in which such potential menace had appeared repeatedly in the last half century, wouldn't your government and people also look to their defenses ?

The policies of Japan with regard to the Far East are clean cut and definite. Where they are under suspicion in Europe and the United States it is due to a lack of understanding of the situation in eastern Asia. In the first place our country wants to see no repetition of military or political invasions of China. We want to see no further establishment of naval bases by Western nations, such as those of the Germans at Tsingtao and the Russians at Port Arthur. Nor would we like to see the inclusion of any part of China proper in the Soviet Union. Already, as you know, outer Mongolia, which borders on Manchuokuo, has been included in the Soviet Union, and even Sinkiang, a vast province of China proper, seems to be coming under Soviet influence.

There are, of course, in China proper what are known as foreign concessions in several of the treaty ports, sections, of cities controlled by foreign countries in order that their commercial representatives may live and trade with the Chinese people in safety and under sanitary conditions. For the protection of their citizens and also of their consular and diplomatic officers the foreign powers, including the United States, have maintained small forces of troops in several of these concessions, and have kept naval vessels in Chinese waters ever since the Boxer rising in 1900. But these practices are only in the nature of police precautions ; they are no menace to Chinese sovereignty.

Would Welcome Stable China

Any nation would be glad to be free of the expense and would withdraw its troops and gunboats as soon as the Chinese government becomes more able to afford protection to foreigners. Japan would welcome the development of such a government in China. In this respect we can sympathize with our great neighbor more fully than others because we ourselves suffered the humiliation of foreign extraterritoriality in the early years of our intercourse with Western nations, before the reorganization of our government, especially its judicial and juridical systems, on modern lines was accomplished.

Our policy with regard to China is by no means what sensational writers in Europe and America imagine it to be. It is what our statesmen have repeatedly declared—and what they would not be able to declare if the policy were not supported by the prevailing ideas of the people of Japan. Public opinion has great influence in Japan. In fact, it dominates our policies.

We are interested in China for two fundamental reasons, as any other nation similarly placed would be. Most of the Western nations are interested only in Chinese trade. We, because of our geographic proximity, are also interested in China's independence and integrity. With others this interest is often sentimental. To us Japanese it is a real and living question.

We are also more interested in trade with the people of our neighboring state than any other nation can be. To the United States, trade with China means only small additions to your commercial profits. It is not to you as a nation a matter of important consequence. It is only about 3 per cent of your foreign trade ; and it is costly to protect in view of the necessity of keeping a number of naval vessels in Chinese waters.

To us the China trade is important. Next to the American people, who are the greatest purchasers of Japanese manufactures, the Chinese are our largest customers. This trade is essential to our welfare. Without it the welfare of our people would be considerably impaired. That is one reason why we seek the friendship of the Chinese people and their government. We are a trading nation and as such we must be on friendly terms with our customers.

It may be asked, then, why we interferred in Manchuria several years ago, That was a special situation. The territory was never a part of China proper. It had been brought into the empire by the Manchus when they conquered China three hundred years ago. It had never been settled by Chinese up to 1898, when the Peking government granted such rights to Russia that it became a protectorate of that country. It was after the railway and other developments which the Russians began that the Chinese started to emigrate there. Manchuria was beyond the Great Wall of China, which marked the boundaries of the country for ten or more centuries.

Soviet Led Drive against Japan

The coming of the Russians had made Manchuria a high road to China and brought it into the sphere of menace to Japan. The Treaty of Portsmouth, which concluded the Russo-Japanese War in 1905, changed the territory's status, leaving Russian influence dominant in northern Manchuria and Japanese influence dominant in the south.

That status might have continued but for the efforts of Russian agents in China beginning in 1925. The effect of Russian propaganda there was to incite Chinese agitators to campaign against so-called capitalistic nations. Many were taken to Moscow and trained there for the purpose. The agitation was directed not only against Japan but also Western nations. It became so violent, you remember, in 1927, that Great Britain, the United States and other Western countries, as well as Japan, found it necessary to increase the number of their naval vessels in Chinese waters and also to send additional forces of troops to several of the treaty ports. It will also be remembered that attacks upon foreigners in that year were so numerous that all missionaries were summoned by their respective consuls to come out of the interior and that even the foreign consuls themselves were driven by Chinese troops out of the present capital of Nanking.

In Manchuria the purpose of the agitation was to drive out the Japanese. There were not many other foreigners there except Russians. The campaign against us made our position exceedingly difficult, but it was a position from which we could not and would not permit ourselves to be ejected. The reason was first strategic and secondly economic.

Japan is not a vast country richly endowed with raw materials. It has become an industrial nation, its people living by their labors. It acquires raw materials largely from abroad. Many come from the United States (And in this connection I may say, incidentally, that we buy more goods from you than you from us). Our next great source of supply is Manchuria. We could not permit ourselves to be deprived of these.

It was we, more than the Chinese or the Russians, or both combined, who had opened the mines of the territory and had made profitable its agricultural resources. It was our engineers who had developed the larger part of the system of railways and the roads for horse and motor vehicles. It was our merchants who had developed the important industry of soya beans. It was our steamship lines that conveyed the crops of Manchuria to foreign ports all over the world. It was the presence of a small force of our troops in Manchuria that insured such peace as existed there.

It was the Japanese, in short, whose enterprise had made possible the welfare of the Chinese of the territory who had deserted their own provinces by the millions to migrate to the land of the Manchus. The agitation to drive us out was unquestionably unjust. It resulted as the world has seen. Our small force of troops turned suddenly upon the enormous army created by the former Chinese bandit who had made himself governor, and drove them out. We then assisted the civil elements in the population to organize a responsible government with the rightful descendant of the Manchu dynasty at its head.

Whatever the rest of the world may say about this movement, the people of Japan believe they have performed a rightful mission. They believe they have not only made their own national and material position better but have improved the lot of the thirty millions of Manchu and Chinese people who live in the new state of Manchukuo. The difference in the conditions of the Chinese living there now from what it was under the administration of the former Chinese war lord is conspicuous. There are still bandits in the country, but they are steadily being hunted down, and law and order prevail there as never before in history.

An evidence of this is to be found in the fact that the reputation of the government has spread to China proper and millions of people are still migrating from south of the Great Wall up into Manchukuo. To their minds does not enter the question of the reigning political régime, only the question of their personal safety and advantage.

The question is also often asked whether the government of Manchukuo is independent. No new government in that position, between China and Russia, could possibly be powerful enough at once to maintain its independence. It must be defended by Japanese troops for a certain period. Russia and China are not only two of the world's largest states; they are states with the largest standing armies in the world. The armies of Russia are nearly a million strong, while those of China, if they were united, would make a force of nearly three million men.

Japan Must be Prepared

Japan has had to face in the past a series of potential menaces. Our people now ardently hope that these have come to an end. But until the condition of China is such that it no longer tempts adventurous foreign nations into the Orient, Japan must be prepared for eventualities. Happily it is not necessary for us to maintain an army the size of either the Russian or Chinese forces. The standing army of our country is only one-third the size of Russia's and not much more than a tenth of that of China.

Another question that is frequently asked is whether we ourselves do not intend to take control of China. To us Japanese that seems like asking. " Are you not likely to go mad ?" Is England likely to attempt to take control of Europe ? China is a territory as large as Europe with a population even greater. Let me quote the words of General Chiang Kai-shek, the head of the government of China, as recently reported by The American Associated Press correspondent at Nanking (according to *The New York Times* of February 2). " The rumor," the General said, " that China eventually will become a protectorate is childish. Those who keep in close touch with Chinese and Japanese relations should know better."

Americans too Hasty

If I may be permitted to make a criticism of the attitude of some Americans I would say that they want to see the problems of other parts of the world settled too quickly. An American friend once told me this story, which is significant. He said he was having lunch one day with another American and an old Chinese scholar. The three were discussing the possible invasion of China by the Japanese and the venerable Chinese scoffed at the idea. " If they should be so stupid," he said, " it would be their end."

" How ?" one of the Americans asked.

" We would absorb them," was the answer, " as we always do the invader. It would not take long."

" How long ?" asked the American.

" Not more than 300 or 400 years."

But the American, my friend said, was not satisfied. He wanted to see it done in his lifetime.

Many of the American people have been sentimental about China for some time. You have been as a nation most generous to her people. Your churches and philanthropic institutions have sent, in all, hundreds of millions of dollars to the country to help the people in different ways. The spirit inspiring this liberality is most commendable. We Japanese have not been able to bestow largess so freely ; we are not so rich. But in our different way, through the necessities of action imposed upon us by conditions, we have been of practical benefit to, I believe, a great number of Chinese.

Japan Educating Chinese

For many years we have been educating thousands of their young men. For every one Chinese student who has come to the United States, ten have come to Japan. It might be that they would prefer to come to the United States, but they cannot do so because of the much greater distance and higher cost. You have given hundreds of them higher education ; we have taught thousands of them practical farming and other profitable industries. You have bought millions of dollars of Chinese products ; we have

(Continued on page 94)

The Realistic Foreign Policy of Japan

By A. E. HINDMARSH in "Foreign Affairs"

FOUR recent deliberate moves by Japan have aroused suspicion and resentment in many parts of the world. By invading Manchuria and establishing the state of Manchuokuo, Japan in 1931 issued a challenge to the world's effort to set up workable machinery for the peaceful settlement of international disputes. That challenge went unanswered, for no state, not even China, was prepared to reply in kind. In 1933 Japan began a drive for trade predominance in markets hitherto regarded as peculiarly the field of Western enterprise. To this challenge there was a prompt response in the form of tariff and quota restrictions aimed at Japanese goods. In recent months Japanese leaders have expressed a dissatisfaction with existing naval ratios and have demanded legal equality with the United States and Great Britain. Finally, on April 17, 1934, the spokesman of the Japanese Foreign Office issued an open claim on Japan's behalf to a position of paramountcy in the Far East, seemingly in disregard of the interests of other major Powers and of formal legal obligations.

In other words, Japanese statesmen, usually farsighted and realistic, appear not to hesitate in pursuing aims certain to provoke international ill-will. A careful observer should at once suspect the existence of some impelling cause behind these manifestations of aggressive policy. It is not enough to say that the Japanese Government and people are at the mercy of a reckless military clique. The Japanese people are disciplined but neither docile nor unintelligent. They have been presented with a reasoned defense of recent foreign policy, and their constant support is based in large part on a line of argument worthy at any rate of repetition in the United States in the interests of mutual understanding. Japan is confronted with a pressing problem; her foreign policy, whether wise or unwise, can be understood only when it is examined with relation to the necessity for solving that problem.

For at least two decades Japan's foreign policy has been chiefly directed towards the alleviation of overcrowding and unrest resulting from excess population. In 1637 the Tokugawa Shogun, Iyeyasu, closed Japan to foreign intercourse and began an era which was not to end until the "hermit nation's" doors were opened in 1853. By that time the desirable empty areas of the earth had been acquired by the white races. For a century and a half prior to the Meiji restoration in 1867, Japan's population remained stationary at about thirty millions. Then the New Japan plunged into a program designed and destined to place herself on a plane of material equality with the states of the Western World. During the half-century from 1860 to 1910 the Japanese nation experienced a series of political, social, and economic upheavals fully equivalent in their combined effect to the European Reformation, Renaissance and Industrial Revolution, as well as the French Revolution. Almost overnight Japan was transformed from a mediæval state with a feudal society to a modern state ranked with the Great Powers of the world. The rapidity of that transformation is illustrated by the fact that one may find to-day in the modern cities of Japan men who in their youth battled in suits of armor and with the deadly two-handed sword of feudal samurai.

The transformation of mediæval Japan into a modern industrial state encouraged a correspondingly rapid increase in population. A whole new class of society, the factory proletariat, was called into being as an inevitable accompaniment of the industrial revolution. People flocked to rising industrial centers, which trebled in size from 1890 to 1925, while the population of the countryside increased only seven per cent. Government-created factories called for workers, and the overflow of the farms provided them. In the first four decades of modern Japan, from 1875 to 1914, the population nearly doubled. This population increase was welcomed and absorbed. By 1925 Japan found her industrial labor markets saturated; but the population increase continued. Japan had advanced in the Western sciences of medicine, sanitation, engineering, etc., to a point where she assured her people of a "European" death rate of 17.72/1000, while they continued to increase at an "Oriental" birth rate of 32.92/1000. Moreover, this birth rate grew at a pace unparalleled in history (25/1000 in 1872, 32.92/1000 in 1926.) The net result has been an alarming increase in population, far beyond the normal needs of the industrial growth which gave it impetus. In 1932 the natural increase, i.e., the difference between births and deaths, reacehed the peak of over one million. To-day, the population of Japan proper is 66,000,000 and the most conservative Japanese study shows the probability that by 1950 it will reach 78,000,000. After that time, assuming the present tendency towards lower fecundity continues, annual births will decrease and the population will probably never exceed 94,000,000. Japan, therefore, is facing a situation which cannot be deemed insoluble, but it is one which calls urgently for immediate alleviation.

What does this mean to the Japanese people? Each year for the next fifteen years there will be an additional million mouths to feed, and 250,000 new jobs to find. With 959 inhabitants for every square kilometer of cultivated land, Japan's population, in terms of persons per unit of cultivated ground, is twice as dense as that of China. It is said that a common impression of Western travellers in Japan is a feeling that one is constantly moving in cities and suburbs of cities. The effect of over-population is not so apparent in the size of the unemployed in the cities as it is in the excessive cutting up of land holdings, which are split into smaller and smaller plots to absorb the increase in family numbers. The average agricultural family of five to-day extracts a living from about two acres of soil. Economic and social pressure urges young men to compete fiercely for relatively secure positions in the government service. A few months ago 10,000 candidates competed for 465 places in the military academy; 300 Imperial University graduates recently fought for eleven places in the diplomatic and consular services. All branches of the government are over-supplied with officials, and it is not uncommon to hear competent observers state that the Japanese bureaucracy is as large and ubiquitous as it is simply because the government has been practically compelled to create places for the thousands of ambitious and brilliant young men who come forward year after year from the colleges and technical schools. Frequent suicides among young intellectuals are ominous of middle-class distress.

How to check this remarkable increase in population or dispose of the excess is Japan's pressing problem. For two decades Japanese leaders viewed the situation with increasing alarm and have examined four possible remedies.

(1) Birth control is immediately suggested as a remedy. It cannot solve the problem, however, for the simple reason that the workers are already born. Moreover, the mass of public opinion is so hostile to this suggestion that it is practically never proposed, even as a future palliative. It is not unusual to hear the suggestion opposed as a foreign plot to undermine Japan's prestige. There is also some religious hostility based on the view that "ancestors are entitled to the good deeds of many descendants." In Japan family worship remains both a sacred and a patriotic duty. Birth control offers no immediate or effective solution to the existing problem.

(2) For a short time emigration seemed to offer possibilities, but its limitations are now only too obvious. The Japanese people are extremely reluctant to leave their homeland, even for lands where opportunity is great and conditions are inviting. Their natural inhibitions are fortified by geographical and legal prohibitions. In the lands which are still legally open to Japanese immigrants, the climatic conditions are forbidding or attract workers with whom the Japanese cannot compete. The tropics, for example, entail competition with natives, or Chinese laborers working under a standard of living which Japanese laborers cannot meet. Manchuria possesses a climate in the main too rigorous for Japanese farmers. The government finds great difficulty in inducing colonists to go even to the Japanese islands of Hokkaido

and Formosa. Korea was once regarded as an outlet for Japanese colonists, but the fact is that the number of Koreans who have emigrated to Japan since 1910 exceeds the number of Japanese who have emigrated to Korea in the same period. The United States and the British Dominions have legally closed the door to Japanese immigration. Only South America remains, and there Brazil alone seems to offer opportunity. In spite of the subsidies which the Japanese Government has offered, however, Brazil has attracted less than 150,000 Japanese to date. Even this outlet is apparently soon to be closed, for a Brazilian constitutional amendment of May 1934 drastically limits the entry of Japanese.

This turning of the tide has been general in nearly all countries which in the past have attracted Japanese emigrants. The year 1930 showed a decrease of over 30 per cent in the number of Japanese residing abroad as compared with the previous year, and the decrease has continued. Official sources attribute this fact to "unfavorable social and other conditions." The total number of Japanese emigrants abroad to-day represents less than half the annual net increase in population at home and the number of repatriates tends to increase.

(3) The possibilities of improving agricultural methods and extending cultivated areas in order to increase home food supplies and absorb rural labor are not great. It is estimated that a general increase of 20 per cent in agricultural returns might be effected by a greater use of scientific methods, grain selection, rotation of crops, and use of fertilizers; and steps are being taken in this direction. The government is attempting also to extend the rice-growing area in Central and Northern Japan. By applying both intensive and extensive agricultural improvement, it hopes to add the equivalent of 75,000 acres yearly to production totals. This is inadequate, however, not merely because the maximum yield per acre is being rapidly approached, but because 142,000 acres must be added each year to meet the rice requirements alone of the annual increase in population.

(4) Birth control, emigration, and agricultural improvement have all been examined or tried as solutions for population pressure without satisfactory result. The Japanese Government has chosen to meet the situation by industrialization at home. It has been found an easier task to export merchandise than to induce Japanese to settle abroad or to persuade unwelcoming countries to accept them. Extension of the economic frontier has, in the case of Manchuria, resulted in extension of political control, but even there the motive was protection of economic interests. In essence, industrialization means the creation of large manufacturing centers which will absorb the surplus farm workers. Japanese goods are now flooding world markets, and the proceeds are used to purchase food supplies and raw materials with which to feed the excess population, give them jobs, and provide new exports.

Japan's challenge is to the industrial states of the West and in the field of industry. Paradoxically, she lacks nearly all the requirements of modern industrial development. Great Britain and the United States control sixty per cent of the world's coal; Japan's reserves of 7½ billion tons will last less than forty years at a stage of industrialization equivalent to that of Germany. There is in Japan no geological promise of oil, and to-day she imports sixty per cent of her needs. Her supply of iron-ore is limited to a few deposits which produce less than half the output of Luxembourg, with a population of 300,000; the equivalent of her total reserves is consumed every twenty months in the United States. More than half of her iron and steel supplies come from overseas. Two-thirds of her water power is already harnessed and in use. Finally, she imports practically all her cotton, rubber, lead, zinc, sugar and dyes. Raw materials, indeed, constiute seventy per cent of her total imports and must continue to come from overseas in increasing proportion. The outlying possessions of Korea, Formosa, and Karafuto consume the whole of their output of coal, ore and cotton. It is not unnatural for Japanese leaders to regard Manchuria as a "life line," for that territory offers deposits of coal, iron ore, cotton-growing areas, and huge supplies of the staple food, soya beans. The coal resources of Manchuria are frequently minimized, but the South Manchurian Railway Company estimates the reserves at 2,700,000,000 metric tons. More than 2,000,000 tons of Fushun coal are exported to Japan yearly from a reserve of a billion tons. Fushun coal, like the 100,000,000 tons in reserve in Penchi, is of superior quality. Manchuria, and indeed all of North China, must loom large in the industrialization plans of Japan.

In her aggressive policy towards China, Japan has given evidence of her determination to control the immediate sources of those raw materials which are necessary to bring about the industrialization of her homeland. But industrialization involves also the sale of manufactured articles in foreign markets, and Japan has learned that an aggressive foreign policy does not guarantee or create stable markets for exports. That the Japanese drive for export trade which began in 1932 has been over-successful is shown by the threats and measures of reprisal employed by her chief competitors. Her export trade has increased in two years by 63 per cent, from Y.1,146,000,000 in 1931 to Y.1,861,000,000 in 1933, and the gain has continued month by mouth, until Japan is now the world's leading exporter of rayon, cotton textiles, matches and raw silk. Last year her textile mills paid dividends of 18 per cent. Her sales to Latin America for the first three months of 1934 doubled those for the same period in 1933. Her exports to the Philippine Islands in the first quarter of 1934 almost doubled those of the first quarter of 1933. In 1932 her exports to Afghanistan totalled one million yen; in 1933 they jumped to twenty-three million yen.

Several factors have contributed to the success of this export trade offensive, but none of them can be called purely accidental. Labor costs in Japan are low, not merely because a simple standard of life prevails among her laborers, but also because her mills and factories are equipped with up-to-date machinery. On a Toyoda spinning machine one operative cares for from twenty to forty spindles, and the number tends to advance; in England the average is from four to eight, and the number is stationary. By going off gold, Japan gave her foreign customers a price reduction of some sixty per cent on Japanese goods. The government has made free use of subsidies, especially to shipping interests, which are thereby induced to extend their services into remote markets. Competent observers have noted the high degree of unification of promotional and sales work, including co-operation in manufacture, unified governmental export control, conditioning and inspection, preferences to Japanese financing, insurance, warehousing and shipping, and the establishment of sales agencies abroad. Trade missions and display boats, or "floating sample marts," are constantly opening up new fields—along the African coast, in Egypt, India, Brazil, Ecuador, Morocco, Australia, Java, Iraq, Persia and Afghanistan. If potential customers have no cash, barter terms are proposed. It was recently reported that Japan had offered to trade Y.100,000,000 worth of warships for Brazilian coffee, and one warship for a quantity of Mexican oil.

Mere enumeration of the factors which have enabled Japan in recent months to undersell her competitors in markets traditionally monopolized by them indicates that Japanese manufacturers have simply become all too efficient in Western industrial methods. American, British and French warships compelled Japan to open her doors and to accept the material standards of the West. Now Japan finds that she can alleviate her population problem only by an industrialization program which menaces the economic superiority of her aggressive tutors in fields long peculiarly their own.

In the fall of 1931 the virtual military conquest of Manchuria by Japan startled the world. The Sino-Japanese crisis, with all its issues, was brought before a world tribunal for debate and a mild form of judgment. Since 1932 Japan's trade offensive has been even more effective and successful than was her Manchurian venture, but no world tribunal exists to try the merits of Japan's case. In reality, political control of Manchuria is merely incidental to Japan's industrialization program, for the impelling reason behind the Manchurian episode was Japan's need for more direct control of raw materials and markets in the interest of expanding trade. Japan's trade offensive is a more real manifestation of her foreign policy than the military conquest of Manchuria.

Japan's dilemma lies in the fact that she can succeed in her plan of industrialization only if she pursues an aggressive foreign policy which must, for various reasons, provoke the resentment of China, Russia, Great Britain and the United States. All of these Powers are interested in China, Japan's chief source of supply both of materials and markets, and Great Britain is vitally affected also by Japan's invasion of other trade markets. But, just as Japan allowed no abatement of her activities in Manchuria as a result of the League of Nations criticism, her present trade drive continues in spite of tariff and quota reprisals laid down by other countries. Japan believes that people will inevitably tend to buy in the cheapest market.

(Continued on page 94)

Communications in Manchuokuo

(The following is an extract from "General Survey of Conditions in Manchuokuo" originally prepared by the Department of Foreign Affairs, Manchuokuo Government, Hsinking, for presentation to the members of the British Industrial Mission on the occasion of their visit to Manchuokuo in October 1934.)

* * *

Railways in Manchuokuo comprise the North Manchuria Railway, 1,721 km., the South Manchuria Railway, 1,129 km. (including the S.M.R. in the Kwantung Leased Territory), and the State Railways, with a total length of 3,725.7 km. of the State Railways the following were constructed after the inauguration of the new régime :

Tunhua-Tumen line .. .. Opened for business, Oct. 1933.	190 km.
Taitung-Hailun line .. .. Opened for business, Dec., 1933.	193.1 km.
Laha-Nungho line .. .. Opened for business, Dec., 1933.	38.8 km.
Kaishantun-Chaoyangchuan line .. .. .. Opened for business, April 1, 1934.	60 km.
Lafa-Harbin line .. .. Opened for business, Sept. 1, 1934.	287.4 km.

In addition the following lines have been opened for provisional traffic :

Tumen-Ninguta line, 115.4 km., and the Tapan-Lingyuan line, 156.7 km.

Although the local lines at present comprise only 238 km. in all, there is a marked tendency on the part of private interests and public bodies to build new railways for local development.

The motor bus business has expanded enormously recently with the construction of new highways. At the end of 1933 there were a total of 39 bus lines comprising 5.461 km., including the State and private lines, as the following figures show :

	State	*Private*	*Total*
No. of bus lines	12	27	39
Total length	2,939 km.	2,522 km.	5,461 km.
No. of motor-cars ..	253	167	420
Capital Invested	MY2,103,632	MY1,430,000	MY3.533,632

All bus services along railway lines or running parallel to such lines, and others over routes which will later become railways, as well as these which play an important rôle in the opening up of new territories and in the maintenance of peace and order, and which are not paying propositions, are managed by the State through the General Board of State Railways as a subsidiary business of the latter. The other bus lines, however, are left to private management.

State Highways

On March 3, 1933, the Bureau of State Highways was established to undertake the building of national highways, and riparian works. In Hsinking, Mukden and Tsitsihar local state highway construction offices were opened and each was entrusted with the construction of state roads within its territory.

With the object of contributing to the maintenance of public peace, and also facilitating local administration, as well as of assisting the economic development of the country, the State Highways Bureau at the outset drew up a road construction program calling for the completion of 60,000 km. of new highways during the next ten years. Under this program, during 1932 and 1933, 62 roads with a total length of 7,550 km. were to be built at an estimated expenditure of 15,000,000 yuan, but this schedule, however, could not be carried out in its entirety owing to the outbreak of the Jehol campaign which necessitated the Government to concentrate its activities on the military expedition. With the completion of the pacification of Jehol Province, however, road building was again commenced in the other parts of the new State.

More than 30 roads totalling over 2,800 km. have been constructed up to the present in the Tungpientao district, the Triangular Zone enclosed by the main line of the S.M.R. and the Antung-Mukden Railway, the north-eastern part of Kirin Province, the vicinity of Hsinking, and in the provinces of Hsingan and Heilungkiang. If the completed sections of the other roads now under construction are added, the total length exceeds 2.300 km. The progress of the road construction program is contributing greatly to the restoration of peace and order, and to the development of communications and the improvement of economic conditions. The building of these new highways has enabled motor-cars to penetrate into even the remotest parts of the country.

Most of the newly-built highways are unpaved, but their surface has been hardened by rollers. For their maintenance and repair the assistance and co-operation of inhabitants along the highways is needed, but the State Highways Bureau is drawing up special plans to keep the roads in good condition. The selection of routes for new highways is also being carefully studied.

River conservancy is another enterprise entrusted to the Bureau. As a part of its river conservancy program, the Bureau has drawn up the following three projects in those parts of the country where such projects will be of direct aid to their industrial development :

(1) As a first undertaking in the Sungari river conservancy work, a huge reservoir to be constructed in the basin of the Yinma river, a tributary of the Sungari :

(2) As a first enterprise in the Taliao-ho Conservancy work, a reservoir in the basin of the Tungliaoho, a tributary of the Liao river ; and

(3) As a flood prevention project, dikes in Jehol province.

In order to obtain basic data for carrying out the Sungari and Liao conservancy works, the Bureau of State Highways is now conducting surveys and water investigation throughout Manchuria. In addition, it is studying the following plans.

(1) Improvement of water utilization enterprises and lands in the Han-ho, Mutanchiang, Nonni and Hulan-ho basins :

(2) Improvement of the waterways of the Sungari and Liao Rivers by dredging operations.

(3) Technical investigations for effecting the improvement of Yingkow (Newchwang) harbor and the Liao river without running counter to the Liao river conservancy projects ; and

(4.) Sectional flood prevention projects for cities situated on the shores of rivers.

Execution of these projects depends on the financial condition of the country, but the Government is considering means of financing them in view of their great importance to the economic development of the country.

Civil Aviation

Civil aviation in Manchuria has made rapid strides since the advent of the new State. In February of this year there were no less than 13 regular air routes operated by the Manchuria Air Transport Company. Aviation in this country is favored by the vastness of the territory and the suitable climatic and topographical conditions. There is a growing demand for regular mail and passenger services, and the use of aeroplanes for conducting special forms of operations in connection with public peace maintenance, and for forestry survey and other aerial investigations. The air routes and the number of trips run on each route per week are as follows :

Routes	*No. of return trips a week*
Shingishu-Mukden	6
Dairen-Hsinking	7
Hsinking-Harbin-Tsitsihar ..	10
Tsitsihar-Manchouli	2
Mukden-Chinchow	
Chinchow-Lingyuan-Chengte (Jehol City)	4
Chinchow-Chinfeng	2
Chihfeng-Weichang-Chengte ..	1
Hsinking-Tumen	3
Harbin-Fuchin	3
Harbin-Tungning	3 (a month)
Harbin-Heiho	3
Tsitsihar-Heiho	1

Rivers and Harbors

For the purpose of regulating shipping on the river in Manchuokuo, the Government has promulgated the River Shipping Law, in addition to establishing navigation bureaux in Harbin, Yingkow and Antung for the administration of matters relating to water courses, harbors, shipping, and water transportation in general. The Yingkow Navigation Bureau in January, 1934, took over the Liao River Conservancy Board, which had up till then been operating independently of the Government. This action was taken in view of the difficulties the Board was encountering in carrying out its projects owing to the lack of funds.

Postal Administration, Telephones and Telegraph

With the pacification of Jehol in 1933, the Government succeeded in bringing the postal administration throughout the country under its complete control. Since then the postal service has been resumed in every part of the State, and various improvements have been introduced in the postal service, and postal charges have been reduced for both domestic and foreign mails. In May, 1933, a postal savings service was created for the benefit of the masses. In addition the new administration has inaugurated an international postal air service, and is also working for the improvement of its postal relations with the other countries of the world.

Although the telegraph and telephone enterprises were formerly under the control and management of the Department of Communications, they were amalgamated into the Manchuria Telegraph and Telephone Company, a Manchuokuo-Japanese joint enterprise with a capital of 50,000,000 yuan, in August, 1933. This step was taken to unify all electric communication enterprises in the country and also to facilitate and expand electric communications between Japan and Manchuokuo, as under the old system great inconvenience was experienced in exchanging communications between the two countries. Since its establishment the new Company has instituted various improvements in its services, inaugurating a wireless telephone service with Japan, and constructing a new wireless station for this purpose in Hsinking.

The Realistic Foreign Policy of Japan

(Continued from page 92)

No government faced with this problem could long avoid the enunciation of a foreign policy designed to meet the requirements of the situation. It is apparent, for example, that in China Japanese foreign policy must find its test, that Japan has a greater interest in seeing peace and order prevail in China than has any other state. Not only does she have direct investments in China exceeding a billion and a quarter dollars, but her dependence upon China as a market and source of supplies increases yearly. Japan's trade with China constitutes 24 per cent of her total foreign trade (as compared with 3½ per cent in the case of the United States and 1.6 per cent in the case of Great Britain). It has been pointed out that for the past sixty years every phase of Japan's intellectual and moral evolution has impelled her to turn away from China. But now economic forces are reuniting her more closely than ever to the continent.

In the light of these considerations, the "special position" which Japan claims for herself in the Far East, a claim which is frankly set forth in almost every declaration of Japanese foreign policy made during the past three years, is at least an understandable matter. That special position is the total of Japan's exceptional treaty rights in China, plus the natural consequences of her geographical position, now rendered more vital by the existence of a pressing population problem the solution of which has been both necessitated and resented by the Western World. The Foreign Minister of Japan has recently declared that his government "has serious responsibilities for the maintenance of peace in Asia, has a firm resolve in that regard," and that his country sincerely hopes for the political and economic rehabilitation of China.

From this claim to primacy of interest in Far Eastern questions and events flows also a claim to naval armaments equal in strength to those of other Great Powers. The interests of these, the Japanese say, are no more extensive than those of Japan. A prominent Japanese writer has asked us to imagine Mexico magnified 2½ times in area and 20 times in population, and the United States diminished in area by 90 per cent and in population by 20 per cent, stripped also of the surplus part of its abundant natural resources and yearly more crowded for room—then, he says, we will have a vivid image of Japan's outlook on China.

Japan's foreign policy may ultimately fail of its objective, but it is nevertheless a realistic policy, based on something more fundamental than a mere militarist concoction. Nor can we assume that a change in government will change the situation, for the policy here outlined seems to offer the only lasting solution. Japan sees herself as contiguous to the two greatest and most restless nations of the world, and yet day by day more dependent economically and strategically on the one of them which is directly subject to the disrupting influence of the other. Her apprehensions may be exaggerated; but they are the mainsprings of her present active policy, and that policy deserves more effort at understanding than is shown when it is dismissed as mere military madness.

The Russian Factor in China

(Continued from page 90)

bought much more. You have built schools for them in China proper, so have we in China and Manchuria. You have opened hospitals for them and taught them modern medicine: so have we. In front of our hospitals in Manchuria the lines of Chinese daily awaiting attention by Japanese doctors are at least as long as those in front of your hospitals awaiting attention by Americans. It seems to me a pity the good works as well as the bad of other countries are not more freely reported.

We Japanese are the near neighbors of the Chinese. We cannot be otherwise. We cannot push China away from us nor remove Japan away from the Asiatic mainland. We have always been neighbors and will always continue to be. We would be stupid people if we designed to do our neighbors injury. It is to our own best interest that the Chinese should thrive, that they should profit by intercourse with us and that they should regard us as valuable friends. This is a thought in the minds of our leading statesmen, and there can be no doubt that the best thinkers in China fully understand it.

Only a few weeks ago (January 22, 1935) Mr. Koki Hirota, Minister for Foreign Affairs of Japan, stated: "Japan attaches great importance to her friendship with the other states in east Asia and counts on their participation in bearing serious responsibilities for the maintenance of peace and order in this part of the world. I fervently hope, therefore, not only that China will soon recover her stability but that she will awaken to a realization of the whole situation of east Asia and undertake to meet the genuine aspirations of our country."

I am glad to learn that such pronouncements are favorably received by responsible Chinese authorities and I sincerely hope that an age of co-operation will dawn upon east Asia.

Communications in China

(Continued from page 85)

the enterprises is to depend upon the income of the enterprises themselves. It is, therefore, difficult during a short space of time for any organization to carry out projects on a large scale. Knowing as we do that the problem of communications is an important one in any country and that in our country means of communications are still in their infant stage, we cannot overlook the imperative necessity of their rapid development. With this in mind, we have endeavored whenever possible to find a way out where there seemed to be none and thus to carry out our projects step by step. What I have said above is the minimum amount of work which the Ministry has been carrying out and which will be completed in the course of the year. If we progress smoothly without any hitch and jar, we shall be able to achieve more than what has been outlined. Now that all the enterprises have shown a turn for the better, the prospect is quite bright. As to those places where means of communication are inadequate, we shall continue to pay special attention to them as we have done in the past two years. But, optimistic as I may be about the future of communication enterprises in China, I fear that any result which has been or may be achieved will appear insignificant when we think of the vast amount of work that remains to be accomplished in that field.

Osaka Railway Station Improvement

By W. HARVEY CLARKE, Jr.

In order to meet the pressing demands from increasing population, the city of Osaka during a period of many years after its central railway station was opened a third of a century ago in 1902 needed better passenger facilities. In 1918 Government Railway authorities drew up the original program for station improvement. Much money and effort was expended during the ensuing decade in formulating detailed plans for remodelling and rebuilding a station that would serve Japan's second largest city for years to come. Actual construction however, which was estimated to cost at least Y.17,000,000, was not begun until June, 1928. Part of the work was finished by the middle of 1934 with the successful transference of the passenger trackways traversing the land level of the station yard to three new platforms on an elevated right of way that was first used for regular traffic on June 1. Salient features of the project to improve Osaka Station are outlined below.

The total annual number of passengers passing through the station within a few years of its opening scarcely exceeded 5,200,000 persons; but aided materially by the continued prosperity of the country's commercial and industrial metropolis, as well as by the growth of the two neighboring cities of Kobe and Kyoto, the number of passengers in later years jumped to more than 20,000,000 annually. To-day the daily average passenger total of Osaka Station reaches a minimum of 100,000 persons, thus more than quadrupling the daily average some 30 years ago. Train arrivals and departures on the trunk lines converging at Osaka Station number about 90 during every 24 hours. The total arrivals and departures present a bigger figure when trains on the Joto, the Seisei, the Fukuchiyama and the lines of minor importance are included.

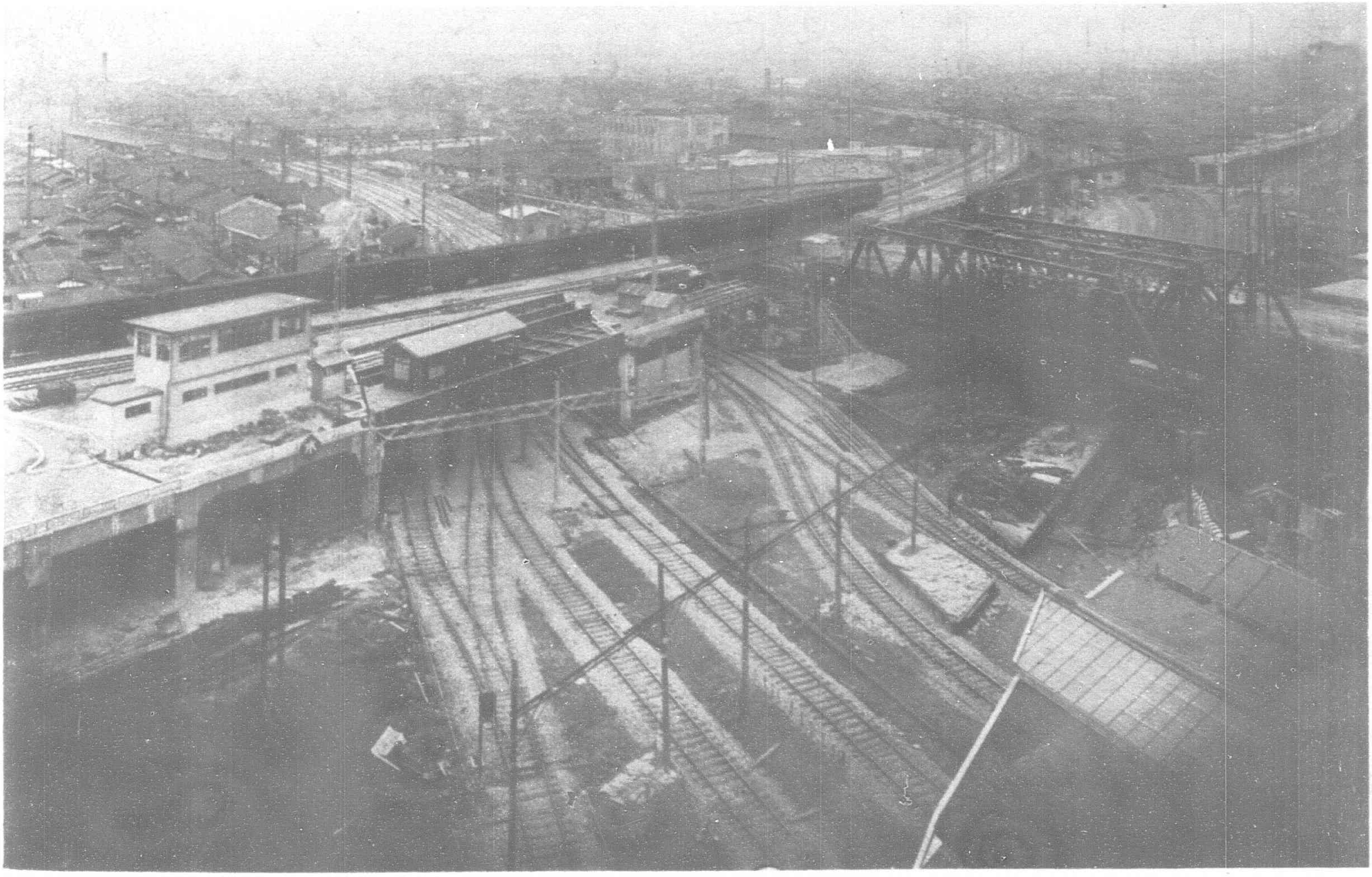
Considering an overwhelming development in the station's activities, railway authorities have long felt the urgent necessity of reconstructing the station and its equipment. The improvement project now under way was much accelerated by decisions handed down by the Osaka City Planning Commission. That body, meeting in 1919, decided that all approaches to Osaka Station should be elevated so as to guarantee the smooth execution of the city-planning scheme for Osaka and its environs.

The Osaka Station improvement plan as formulated by Government Railway authorities under these circumstances called for the complete separation of the station's facilities for passenger trains from those for freight trains, and reserved the elevated part of the station exclusively for passenger service.

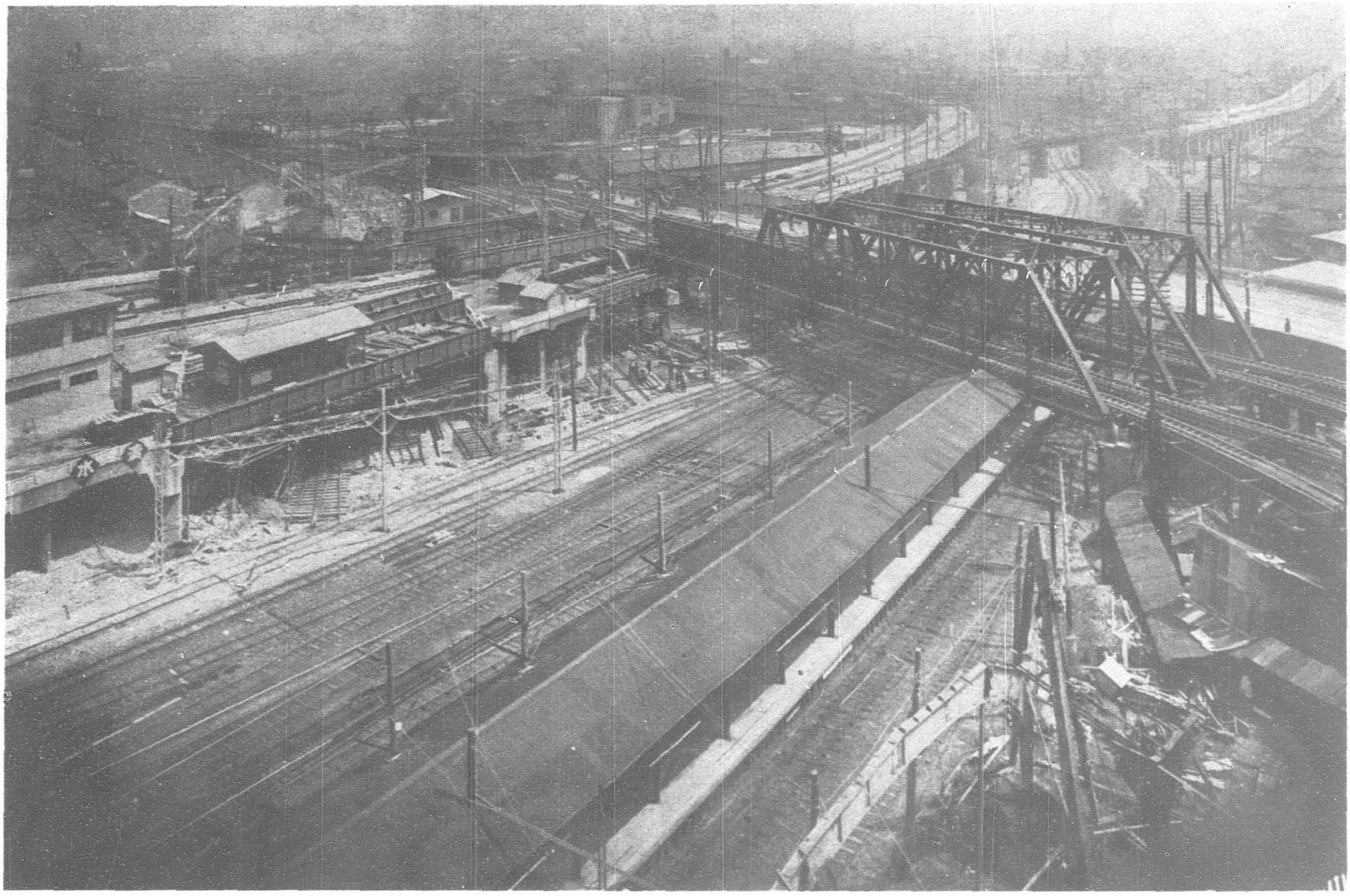
The new passenger station to result from the plan for improvement includes five platforms, with space provided to add a sixth platform sometime in the future. These platforms are 10 meters wide and 266 meters long, excepting the first platform which has a length of only 165 meters.

To the west of these passenger platforms is a baggage platform six meters wide and 100 meters long. A comparision between the departures of steam and electric trains from the old platforms on the land level and from the new platforms on the elevated structure is given as follows:

		New Elevated Platforms	
Lines	*Old Platforms*	*Three Platforms*	*Five Platforms*
Joto	1	1	2
Down trains ..	2	1	3
Down electric trains	0	1	1



Hankyu Interurban Electric Line's right of way where it passes underneath Government Railway's newly elevated tracks in Osaka Station Yard on June 10, 1934, ten days after abandonment of old trackways on girder viaduct

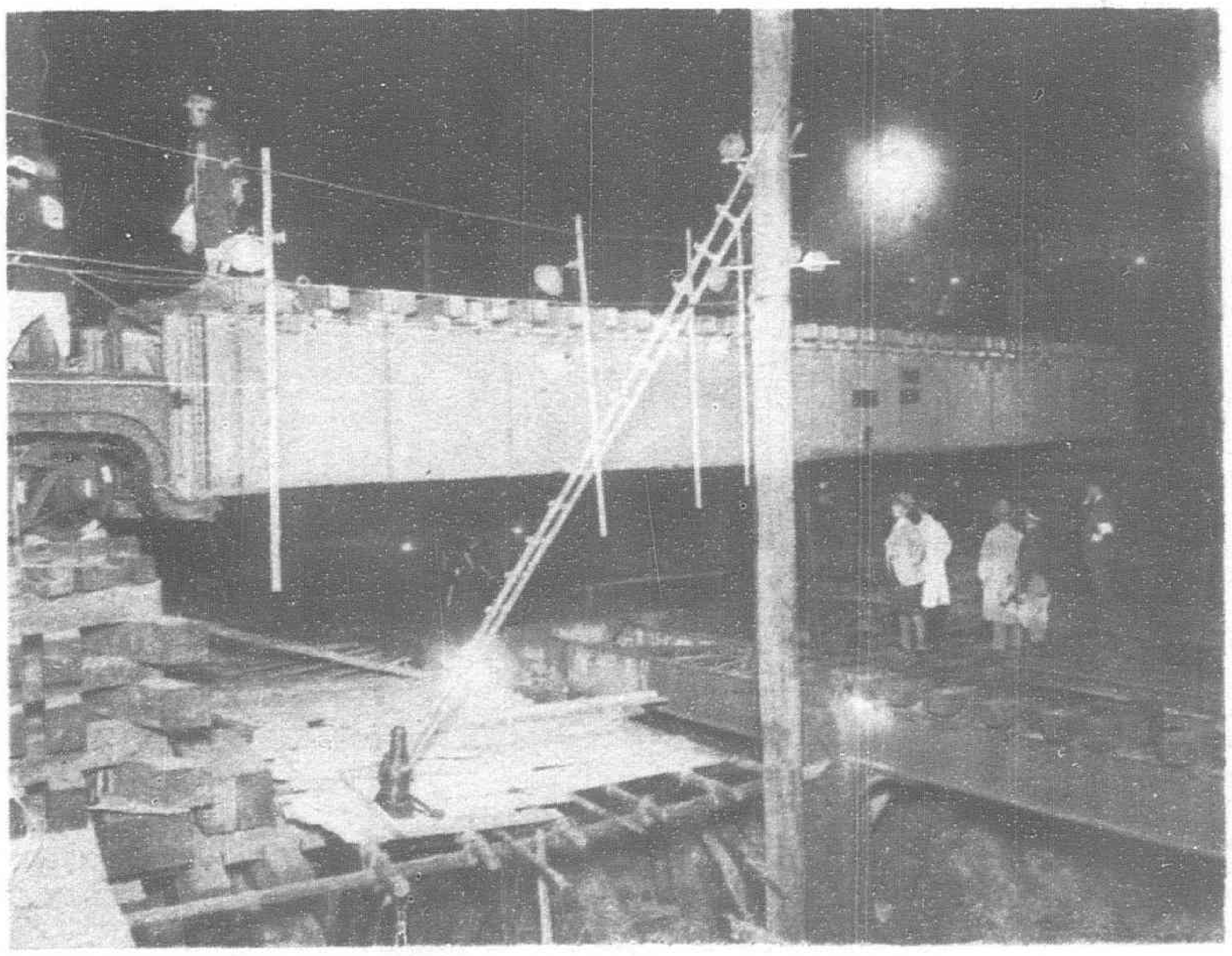


Osaka Station Yard on May 14, 1934, 17 days before Hankyu Electric Interurban Line's right of way was transferred from girder bridge on right to ground level in foreground to pass directly under Government Railway's new elevated structure

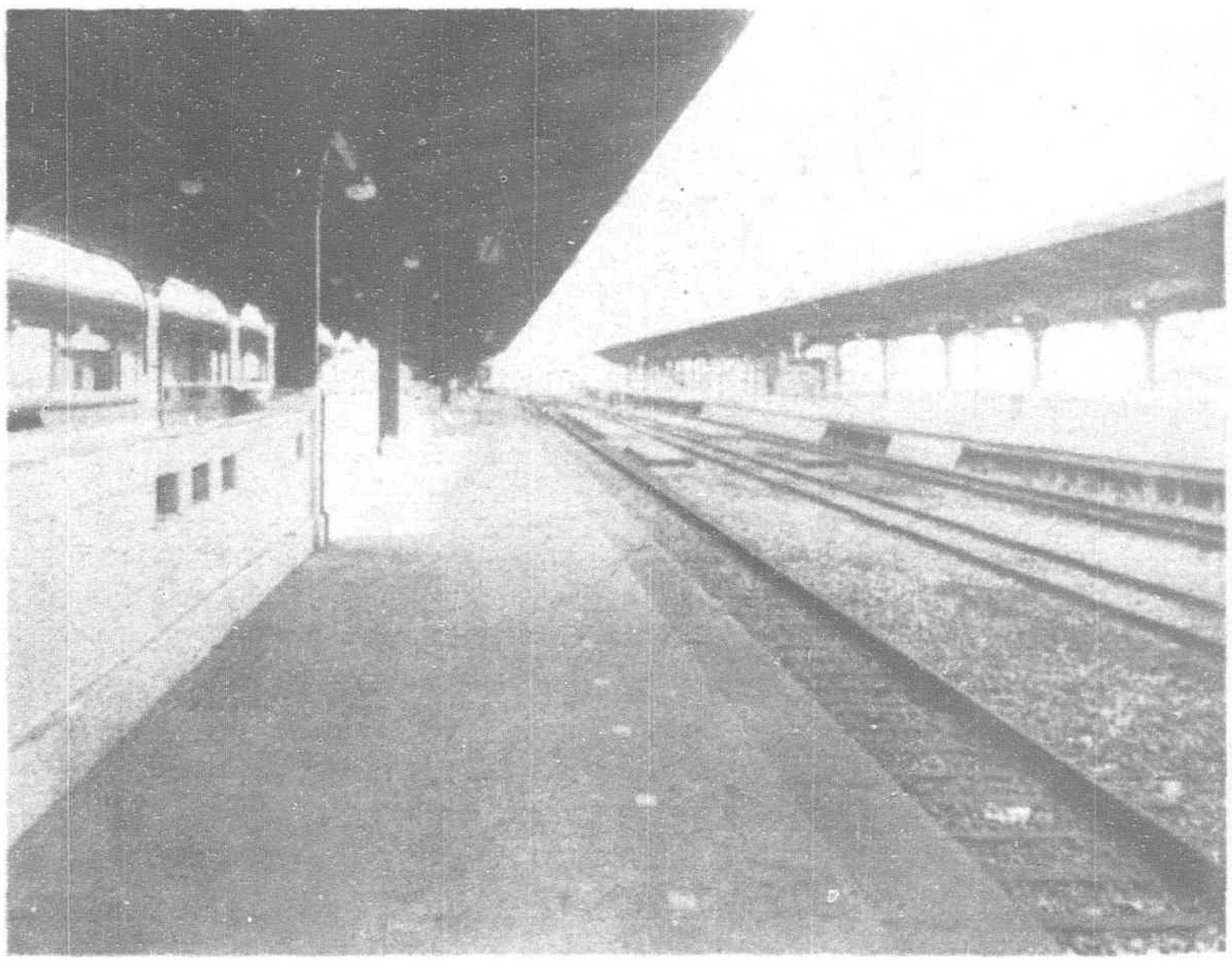
		New Elevated Platforms	
Lines	*Old Platforms*	*Three Platforms*	*Five Platforms*
Up trains ..	2	2	3
Up electric trains	0	1	1
Down starting platforms ..	1	2	0
Seisei	1	0	1
Fukuchiyama ..	1	0	0
Total	8	8	11

Built of ferro-concrete the platforms are reinforced by steel slabs faced with asphalt blocks. The station yard where the platforms are located covers an approximate area of 6,600 square meters, extending 100 meters from north to south and 1,000 meters from east to west. The open space beneath the elevated right of way has an area exceeding 27,000 square meters utilized variously for both passenger and freight warehouses.

The new station building, now in process of being designed, will have a floor area of 5,400 square meters, and may house a station hotel within its structure.



Scene photographed shortly after midnight during process of elevating track sections for Osaka's new railway station



Three spacious platforms having wing-type roofs completed during 1934 on new elevated structure at Osaka Station

A spacious concourse for a passengers' waiting place will be a feature of the new station. From this will radiate several passways leading to the different platforms through wickets and up stairways. Two exits will be provided for the convenience of passengers, one on the east and the other on the west side of the building.

The elevated structure begins at West Bridge of the Kamiyodo River and ends at East Bridge of the Shimoyodo River, a distance of 4,000 meters. This portion of the station will be of concrete slab construction, with the exception of an 840-meter stretch at each extremity of the elevated right of way that is built over reclaimed land. Due to the insecure foundation of the ground in Osaka, the city being situated on soft terrane at the mouth of the Yodo River, reinforced concrete piles 25 to 30 centimeters in diameter and 4.6 to 7.6 meters long, are being used for the foundation work. The safety-weight is calculated at 13.5/15 tons deadweight.

The plaza in front of the prospective station will be expanded from its present 32-*ken* width (one *ken* equalling six feet) to 50 *ken* by making use of 18 *ken* of the site occupied by the present station building. Of this 50 *ken*, 26 *ken* on one side of the station will be used for the plaza and 24 *ken* on the other side for a new boulevard.

Working after midnight on most difficult part of elevating trackways of Osaka's new railway station, May 31-June 1, 1934

Osaka Station's new plaza is expected to become the busiest traffic center in the city, where five principal transportation systems will meet—Osaka Station of the Government Railways in the center, the Hankyu Interurban Terminal on the east, a Municipal Subway station in front alongside the Hanshin Electric Railway station and the Keihan Railway Terminal on the north.

Cost of Osaka's New Passenger Station

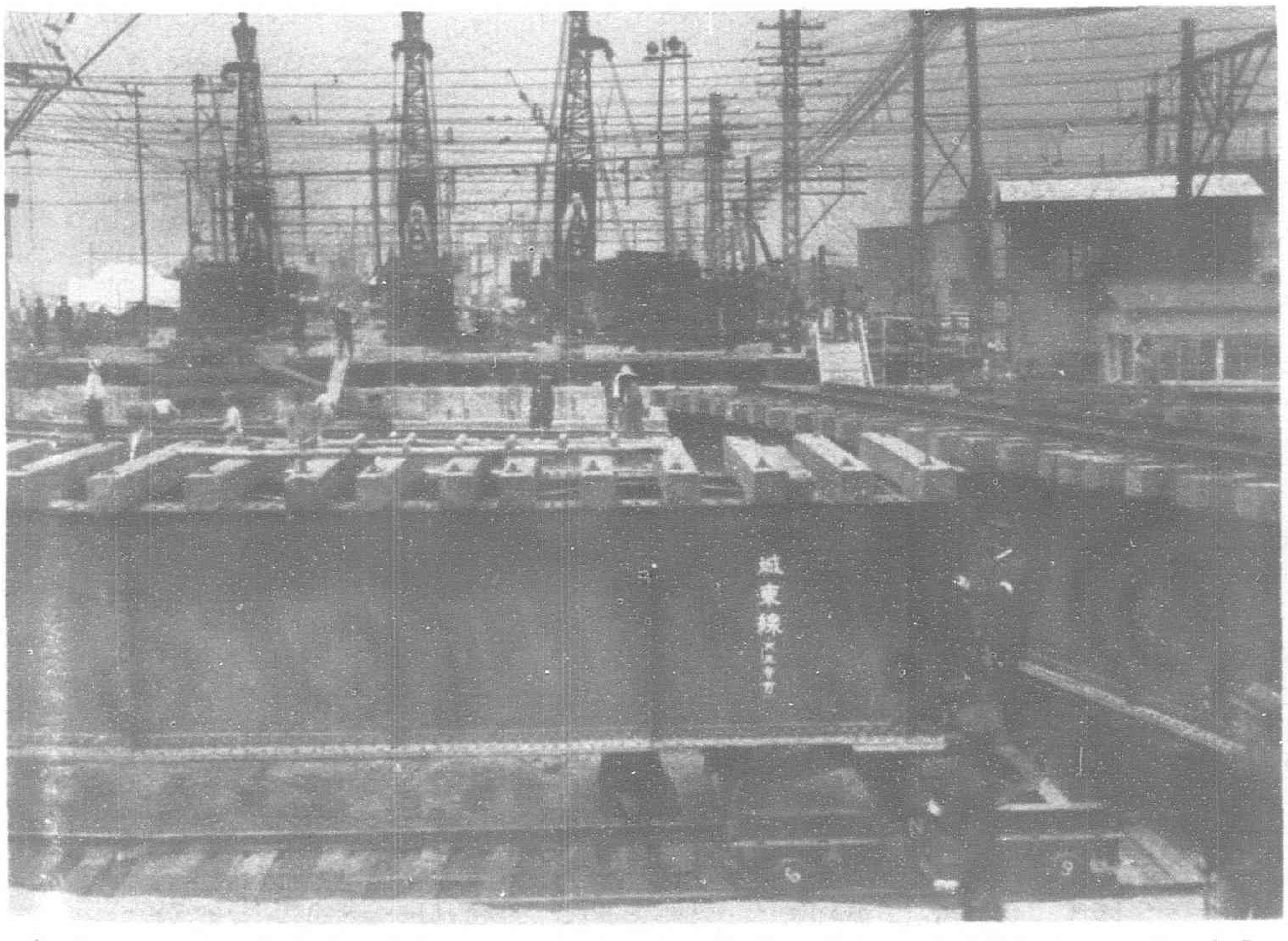
(WORK BEGUN in 1928—SCHEDULED TO BE COMPLETED IN 1937)

Total outlay	Y.19,319,800
Total expenditures from 1914 to fiscal year 1932	9,342,700
Expenditures for fiscal year 1933 and thereafter	9,977,100

As the initial step in the improvement work for Osaka's new passenger station, freight platforms were separated entirely from the station itself and transferred to the Umeda freight depot. All railway activities, including washing, repairing and making up of trains, et cetera, were removed to special premises prepared in the station's facilities entirely indispensable to the operation of railway traffic were left unaltered. Within the space made available as the result of readjustment was begun the construction of three elevated platforms. These three right of ways were completed by the middle of 1934, and the land level lines transferred to the new elevated structure on June 1 of the year.

Further work is progressing now on the fourth platform and preparations are being made to begin construction of the fifth as well as the station building itself. The chief undertakings necessitated in improving Osaka Station during 1934 and thereafter include the following items:

(1) Building of banks.
(2) Sloping roadway in Chayamachi district and lowering Hankyu line tracks.
(3) Transferring water mains and pipes.
(4) Widening the Dojima Canal.
(5) Completion of sewerage system in station yard.
(6) Construction of elevated bridges to span Umeda Boulevard.
(7) Erection of girders B and C of the 1st elevated bridge across the Hankyu line.
(8) Construction of the Chayamachi elevated bridge.
(9) Removal of connecting bridge on Joto Line.
(10) Construction of 1st platform.
(11) Construction of 2nd platform.
(12) Erection of steel girders for elevated bridge in station yard.
(13) Construction of a new elevated connecting bridge on Joto Line.
(14) Connection of Seisei Line with the elevated right of way.
(15) Rail-laying in station yard.
(16) Adjustment of space for new station plaza, et cetera.
(17) Construction of new station building and other important structures in the yard.
(18) Installation of heating and ventilating systems.
(19) Erection of roofs for platforms.
(20) Removal of temporary buildings used during construction work.
(21) Installation of electrical apparatus and equipment.



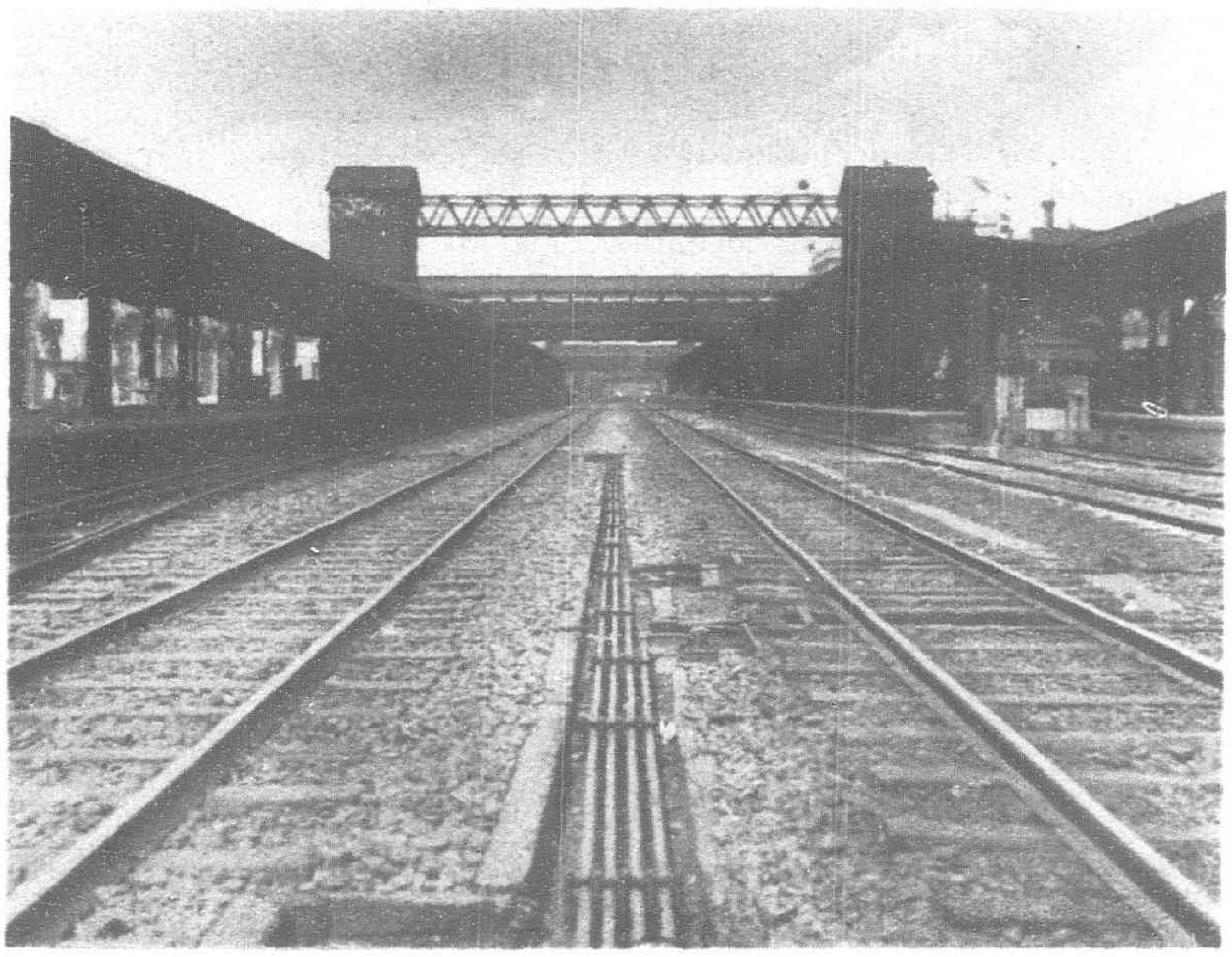
Sectional parts of Osaka station's track structure before being placed for new elevated right of way

Transference of Lines on Land Level to Adjoining New Elevated Structure

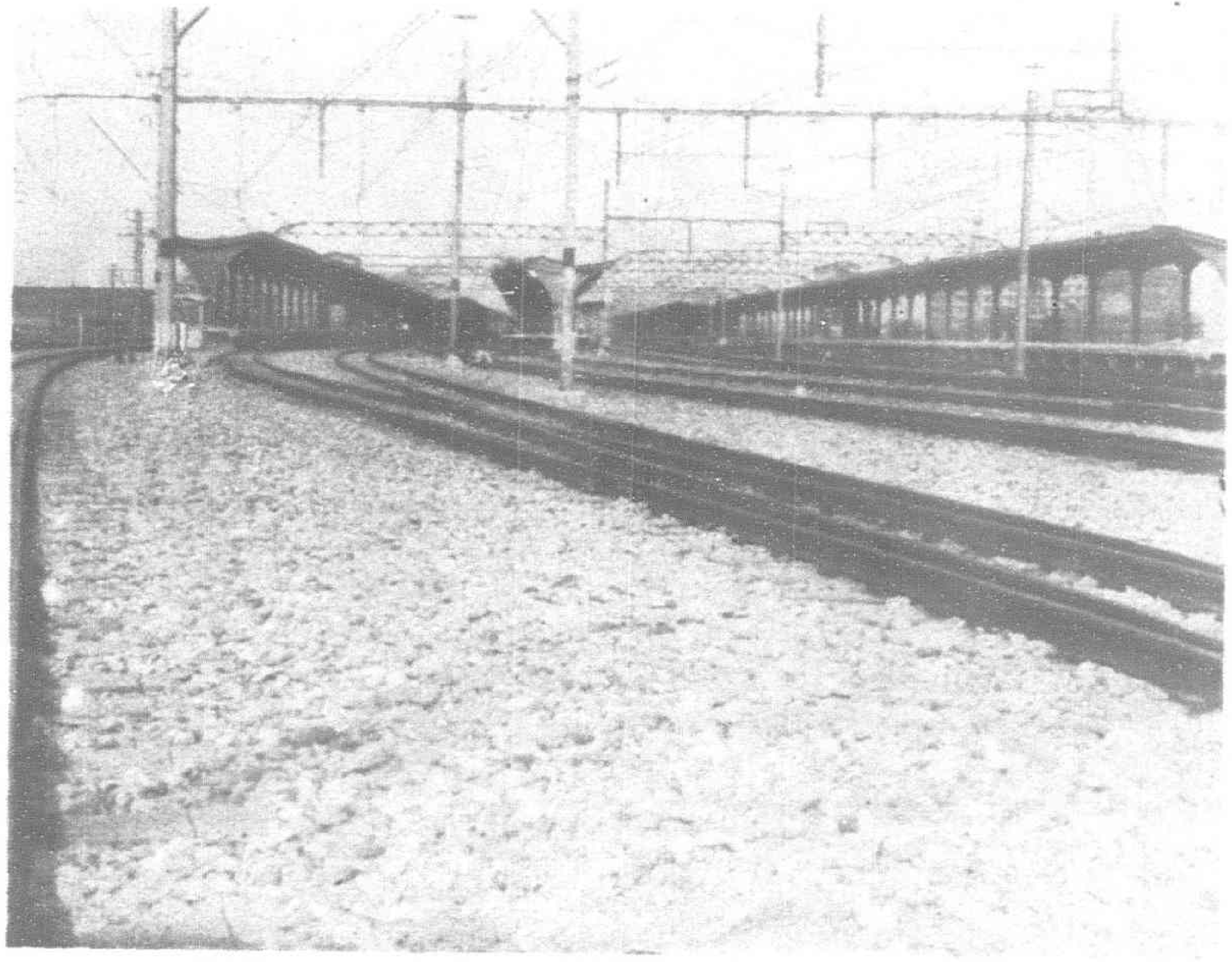
Line transference from the land level to the elevated structure was executed during a short period of time after midnight between the passage of the last night train and the first morning train. It was so planned that the last train would run on the land level tracks, while the first morning train the following day would pass on the tracks of the new elevated structure.

There were seven trackways to be transferred in the task of replacing the land level lines with the elevated right of way. Of these, two sections were crossed by electric railway lines and two others by highways. The electric railway that ran above the old land level railroad across a girder bridge viaduct was changed to pass under the new elevated structure. The most difficult part of the work of transference was at the Hankyu crossing, where there were many tracks of both the Government and the Hankyu lines, including two Kobe lines, two Takaradzuka lines and one connecting. On the night the change was undertaken, three of the Government Railway lines, including two Tokaido lines and one Joto line, were elevated above the non-state right of way.

Transference was effected within the originally scheduled time. The trial run of a test locomotive was made along the new right of way at 4.28 a.m. on both the Tokaido up and down lines, on the Joto line at 4.31 a.m., on the Seisei freight line at 2.20 a.m. and on the west freight line in the station yard at 4.53 a.m., on June 1, 1934, without any unforeseen interference.



A thing of the past: Osaka Station as it appeared last year prior to elevation of its tracks and platforms at an adjoining site. This old station was demolished



Approach to Osaka Station's three new platforms photographed from tracks elevated last year

Electric Trains for Ceylon

The Ceylon Government's Consulting Engineers in London have, it is learned, recommended an enquiry into the possibilities of the electrification of the local railways.

In a recent report the Consulting Engineers expressed the opinion that, with the adoption of the Hydro-Electric Scheme, electrification schemes for the local railways should be completed in about fifteen years. They recommend an investigation on the subject, particularly in regard to the section of the railway between Colombo and Moratuwa the electrification of which may be effected with the existing power supply.

The question of the electrification of the railways is dealt with by the Consulting Engineers in a report on the proposal of the Executive Committee of Communications and Works to purchase three broad gauge light weight passenger units with incorporated Diesel electric units at a cost of Rs.836,400.

The State Council referred the proposal back to the Executive Committee with the request to get expert advice on it from the Consulting Engineers to the Crown Agents.

The State Council, however, approved the proposal of the Ministry of Communications and Works to accept the offer of a loan, made by the firm of Messrs. Armstrong Whitworth, of two Diesel electric locomotives for trial runs on the local railways.

It is understood that the Consulting Engineers have expressed the opinion that it would be advisable to try Diesel electric units pending the electrification of the railways. They have suggested that a certain number of these units may be purchased by the Ceylon Government.

The Executive Committee of Communications and Works proposes, it is learned, shortly to submit a report on the subject to the State Council recommending the purchase of probably three such units.

China Buys Machinery

The *Leeds Mercury* reports that during the past few months some large orders for new machinery have been placed with engineering firms in the West Riding to the order of the Chinese Government Department of Reconstruction.

The business has been booked in keen competition with foreign countries, and when the machinery reaches its destination it will be run by the Chinese themselves.

Fifty years ago, Messrs. William Whiteley and Sons, Ltd., textile engineers, of Prospect Ironworks, Lockwood, Huddersfield, supplied some machinery to a woollen mill in Canton. A few months ago they secured an order to replace this with new plant, and they have now shipped to China a complete, up-to-date finishing plant, together with winding, twisting and warping machinery.

The machinery has been sent via Birkenhead in 82 cases, weighing 70 tons, a special train being chartered to carry it from Lockwood to the Merseyside port.

When the plant reaches Canton it will be taken over by the Government Department of Reconstruction, who will supervise its erection and installation.

Subsequently it will be run under the direction of Chinese engineering and textile students—"key" men or, departmental executives—who have received their training at Leeds University.

Apparently China does not wish to be simply a dumping ground for Japan's surplus textile products, but intends to develop her own manufacturing industries, and Messrs. Whiteley's shipment is but one illustration of the quiet but efficient manner in which she is pursuing her purpose.

Preliminary Report on Water Power Development in Shansi

By O. J. TODD, Chief Engineer, China International Famine Relief Commission

In order to present in a concise review the possibilities of water power development in the Province of Shansi this report has been prepared based on studies made supplementary to the main surveys for water conservancy in this province. Since the chief object in mind is to furnish cheap power to pump water for irrigating plateau lands in the Hotung region of south-west Shansi and to furnish low priced power for industrial development along the Fen Ho, this report does not cover all parts of Shansi. It centers around the problem of conserving the potential power of the famous Hu-k'ou Falls of the Yellow River along the western border of the province. The other three minor water power developments are of little importance in comparison, but the figures prepared in connection with their utilization will interest all those in Shansi who favor an extensiv edevelopment of her hydro-electric power.

For centuries water power has been used to grind grain into flour or wood into incense powder along the many streams of China where fall is rapid. These water power developments are of rather low efficiency being wooden wheels of the horizontal type on a vertical shaft that is attached to grinding stones located in a small millroom a few feet above. The head of water used varies from four to eight feet as a rule. Many such mills operated by water wheels are seen along the Yeh Ho as one travels from Shihchiachwang to Taiyuanfu. Immediately below Chintze Springs, Kwang Sheng Sze Springs and Chu Wo Falls are found many such mills operated by water flowing through channels that also act as irrigation main canals.

Our recent investigations show that these old type water wheels are as wasteful here in China as they have been in other countries, though they have served a useful purpose and have been the logical forerunners of modern hydro-electric plants using steel turbines of high efficiency. The principle of "highest use" applies to flowing water as much as it does to pasture lands and forest. Therefore the matter of utilizing to the full the water power such as is found at Chintze, Kwang Sheng Sze and Chu Wo is recommended.

In searching for data on these several power projects little was found from which to start. As yet no hydro-electric development has been undertaken in Shansi as far as our investigations could determine. Cheap labor and cheap coal have furnished such low priced power that few felt the development of water power was worthy of attention beyond the primitive methods that have prevailed for many hundreds of years. An attempt had been made to develop the potential water power at Chintze Springs in one small hydro-electric plant, but owners of small mills would not permit this, demanding exhorbitant prices for their holdings and their water rights. This was but a few years ago and discouraged the promoters. The State will be obliged to take over such development and condemn such properties as may interefere with the best interests of the community as a whole.

Two minor investigations of Hu-k'ou Falls on the Yellow River were made in late 1932. One was by a foreign engineer who spent a day or two at the falls and drew up a tentative plan for development of power basing his figures on such measurements as he made himself on that short trip. The other investigation was by two young men in the Geological Survey of China who spent more than a month taking topography in the vicinity of these falls. Both of these studies were of a very preliminary nature but such data as they furnished aided in checking against further data collected by our engineers when they conducted more thorough studies.

Since the work undertaken by the Shansi Water Conservancy Commission is entirely connected with the problem of food supply and the improvement of living conditions within the province, this report aims to bring attention of both Chinese and foreigners to the economic benefits of the work proposed by the plans discussed herein. It is not a problem of flood control but one of power utilization to the end that more good farm lands may be irrigated so that more grain, cotton, etc., may be produced, and more local industries developed at costs that permit competition with districts outside the province. It will have a distinctly modernizing effect on this part of China and revolutionize living conditions in this region. From a famine prevention standpoint these developments seem to be quite as important as the storage of winter flow in the Fen Ho for spring irrigation though much less attention has been given the problem. The two undertakings are of such vital importance to the province that they may well go forward at the same time in an effort to insure this province permanently against famine hazards.

The Yellow River Falls at Hu-k'ou 70 feet drop

History of Investigations

The great fluctuation in flow from dry season to wet and the heavy silt load in most of Shansi's rivers have mitigated against hydro-electric development. Storage of flood waters was impractical due to the danger of rapid silting up of reservoirs. Therefore of Shansi's many streams those had to be selected that were either spring fed or had ample low water discharge. Development of power on a large scale along the Fen Ho seemed impractical, when the costs were considered, due to this problem of storage, though there are good dam sites in the gorges just above Lantsun. The low water flow seemed too small to warrant power development by an expensive masonry dam when coal for steam power was so convenient and low in price.

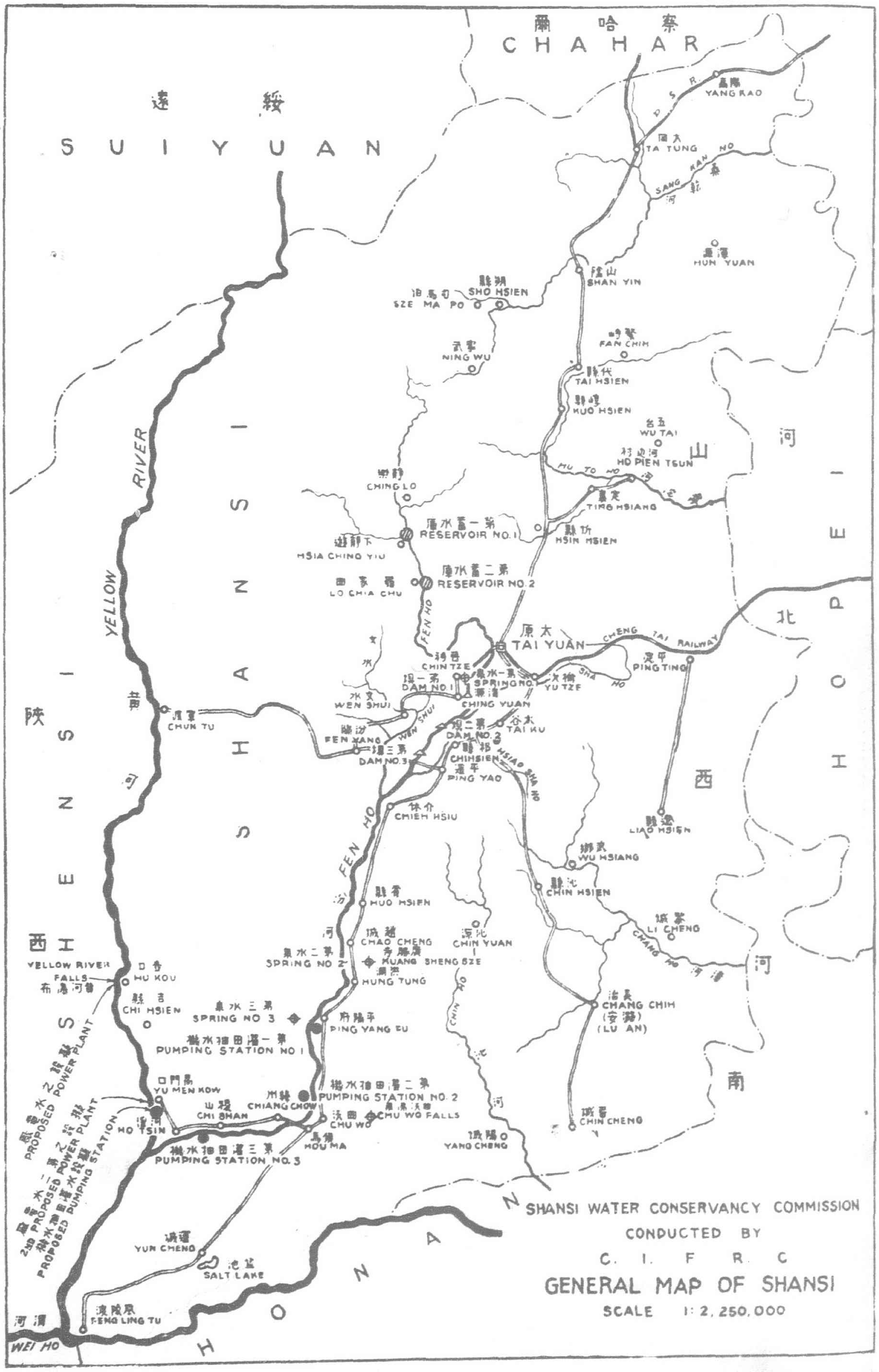
The falls and rapids in the Yellow River on the west border of Shansi have been known chiefly to boatmen until very recently. This region is so difficult of access that few engineers have ever been in the immediate vicinity. Upon the formation of the Shansi Water Conservancy Commission, however, there was a desire on the part of officials to know more about this source of power and I was requested to make preliminary studies.

My first visit to these falls was in April, 1933, when President L. H. Wang, of Shansi University, accompanied me. My second trip was made last month when Mr. T. E. Armstrong (Mining Engineer) and Mr. M. T. Li (Civil Engineer) accompanied me to make certain check measurements, take further photographs of the falls and the proposed power house site, and inspect the rapids from there to Yumenk'ou by boat. My own observations were supplemented by detailed surveys made early this year by the Commission's regular survey staff aided by a trained geologist.

Road surveys have been made to these falls both from Pingyangfu and Hotsin in order to work out the most practical means of ingress when materials of construction and machinery must be hauled to the site. A survey was also made from the falls to Yumenk'ou and the mouth of the Fen Ho in order to tie up with the more extensive Fen Ho surveys. This furnished the necessary information concerning a second possible power development at the lower end of the Yellow River gorges near Yumenk'ou.

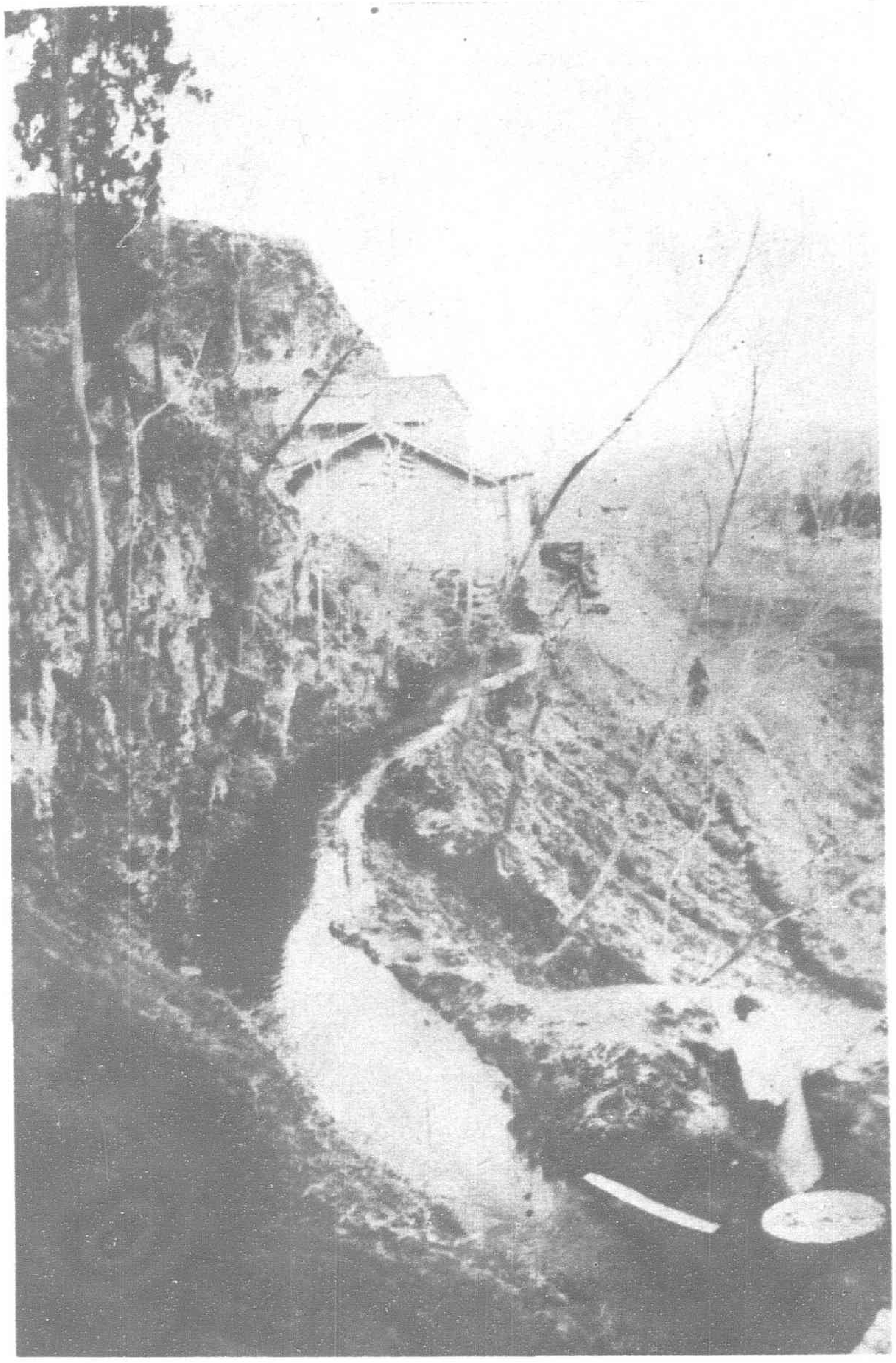
Based on these 1934 surveys made by our own staff a plan has been worked out for developing 50,000 horse-power at these Hu-k'ou Falls by the use of the most modern type of turbine and utilizing a fall of approximately 100 feet over a stretch of less that 5,000 feet from the diversion dam above the falls to the selected power house site. The details of the plan have been worked out during the past three months in our Taiyuanfu office.

PLATE 1



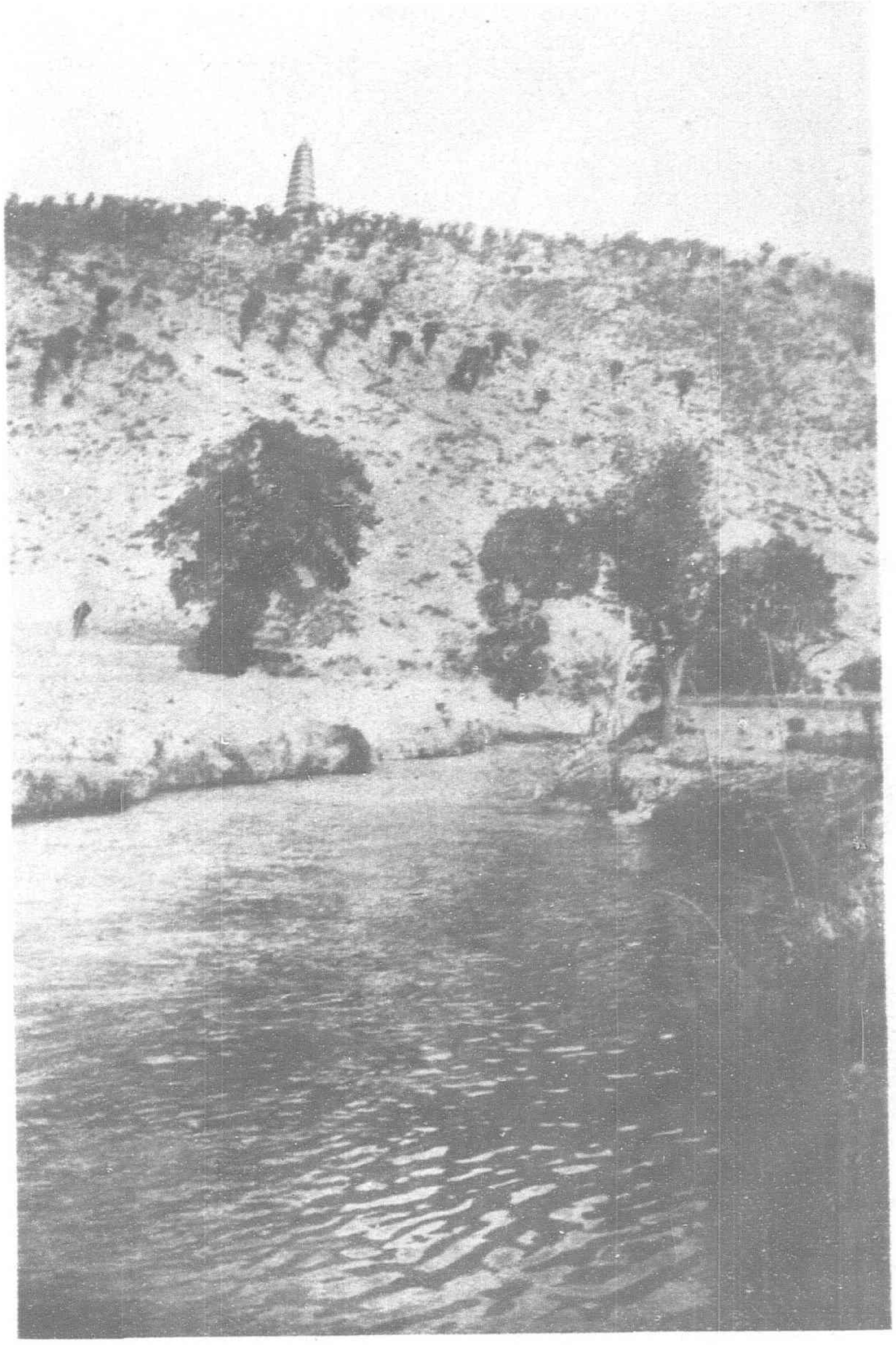
The other water power developments studied are three, being located at springs that feed into the Fen Ho. They are all rather small projects but illustrate what may be done in Shansi to conserve water power that is now used in a wasteful manner or but partially. The surveys of these projects have been made by our regular surveyors during 1934 and the plans for developing this power have been worked out from the data thus obtained.

In connection with the development of the Yellow River Falls, studies were also made of three pumping projects for using this new power to help irrigate three districts in the Hotsin area. A complete topographical survey was made of one of these areas, but in the case of the other two old maps were used for getting approximate heights and areas. One line of levels was run to check contours of military maps. Further surveys on these areas will follow. The projects were laid out in recent weeks by our engineers, utilizing all dependable data extant.



Irrigation and Power Canal near Chu Wo Falls, Shansi

1



Where a 100 second-foot flow comes from the Kwang Sheng Sze Springs

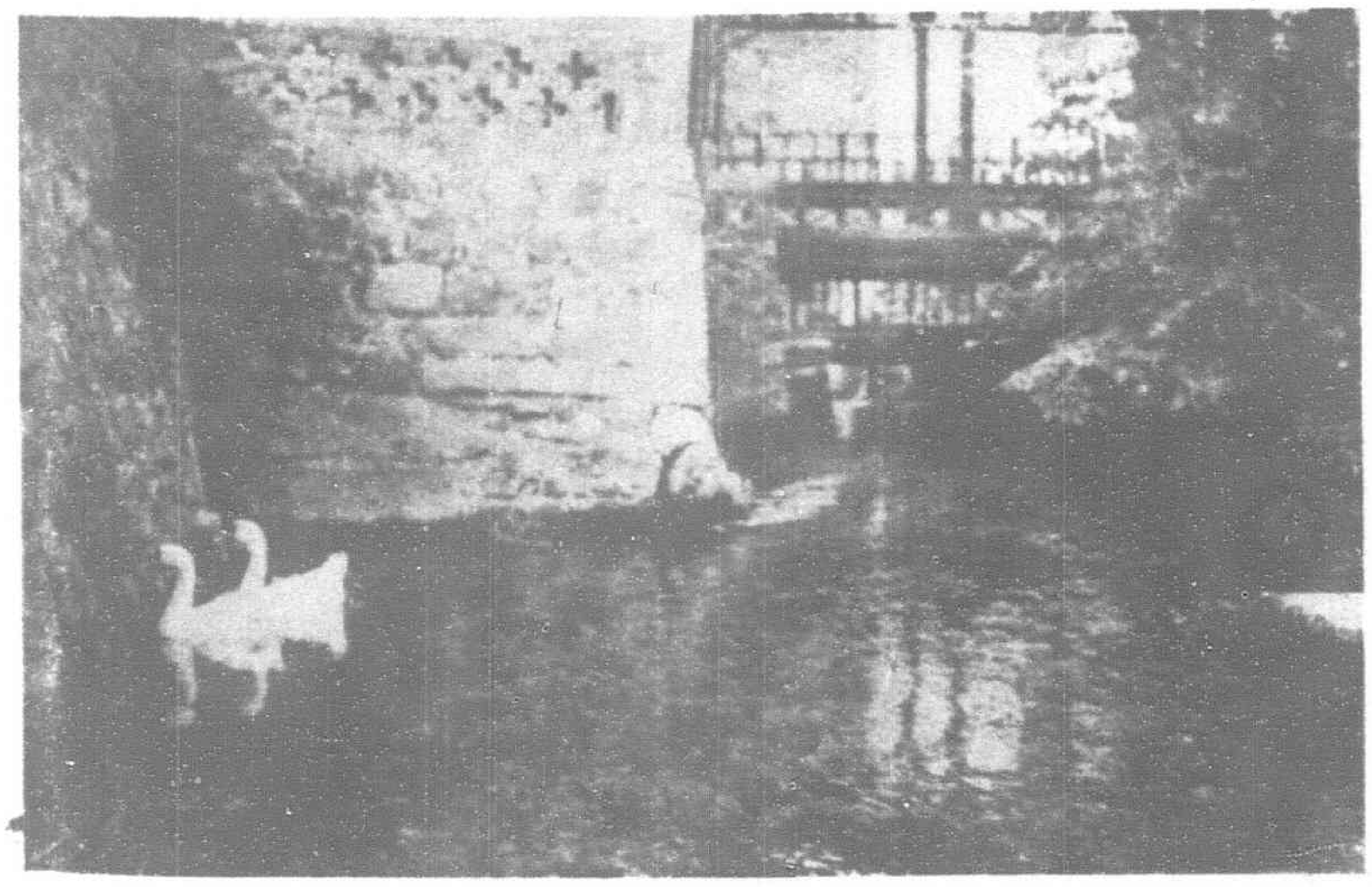
2

These studies therefore cover the following projects :

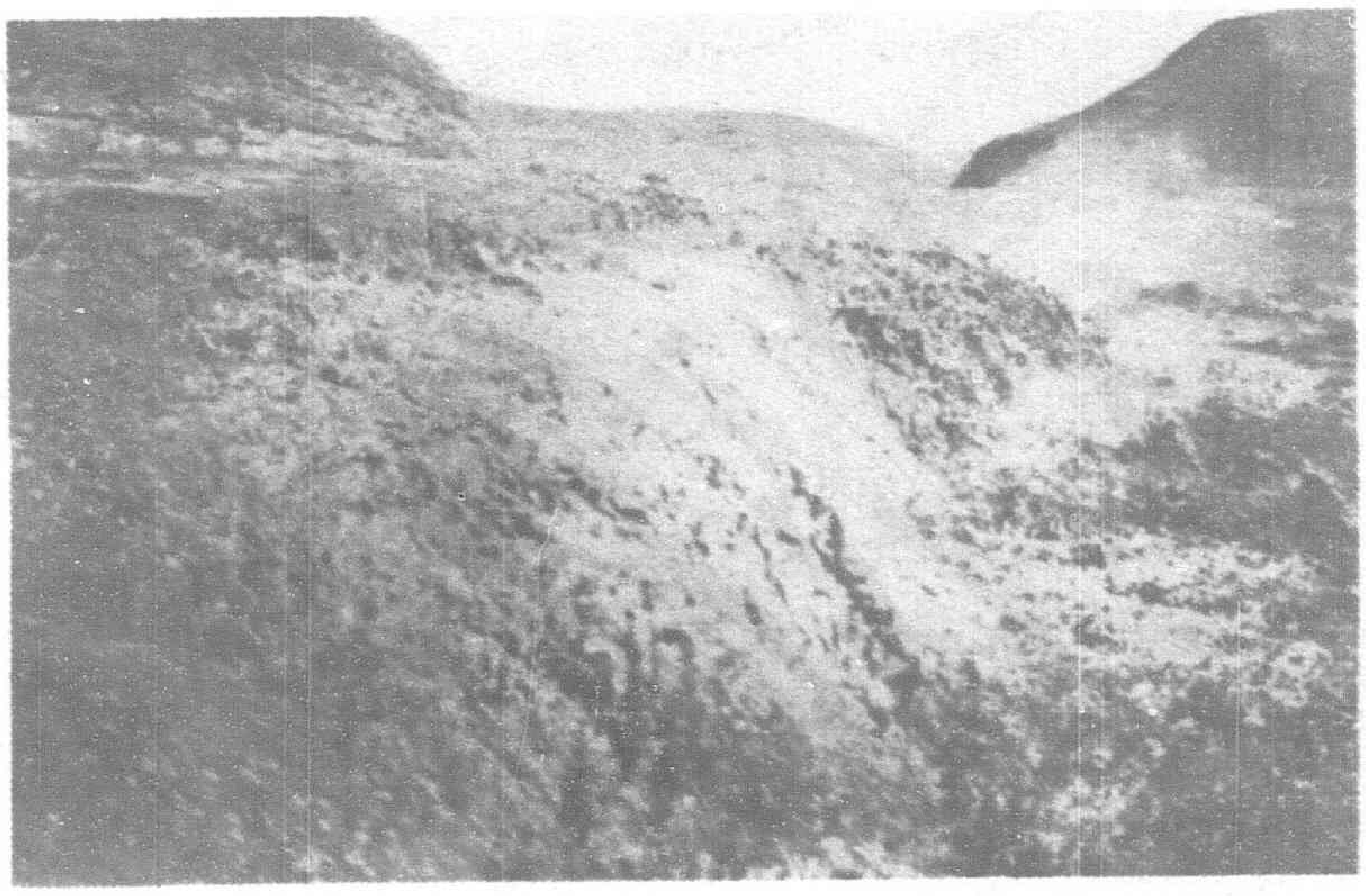
(1) Yellow River Falls, 50,000 horse-power installation
(2) Kwang Sheng Sze Springs, 1,400 horse-power installation
(3) Chu Wo Falls, 400 horse-power installation
(4) Chintze Springs, 250 horse-power installation
(5) Hotung Pumping Plant, 266,400 gallons per minute
(6) Yumenk'ou Pumping Plant, 8,623 gallons per minute
(7) Lungmenchu Pumping Plant, 134,640 gallons per minute.

The Yellow River Falls Project

In considering economical hydro-electric developments in China probably there is no other project as attractive as the Hu-k'ou Falls of the Yellow River, 125 miles north of Tungkwan, Shensi, where the river bends to the east forming a great elbow. It should be a bi-provincial undertaking or one where special rights are granted by the national government since the river is on the boundary between Shansi and Shensi at the falls and for many miles



At the Main Spring of Chintze



A close-up view of Hu-k'ou Falls from west bank of Yellow River, October 25, 1934 above and below that point. The project is, therefore, of national importance in certain respects. The power developed there would certainly be needed in both Shansi and Shensi provinces. But the development may be made by Shansi under federal grant and part of the power sold to Shensi according to agreements made when special rights are assigned by Shensi to the lands on the western bank of the river at and near the falls.

The present proposal is for development of a part only of the potential power at these falls. Even in the lowest stages of the Yellow River 50,000 horse-power may be developed at this point. Without the use of an auxiliary steam plant to take care of the very low water periods these falls may be developed to double this capacity. Also there are opportunities for developing another 50,000 horse-power of hydro-electric energy throughout the year by damming the river near Yumenk'ou at the lower end of the gorges, 60 miles south of the falls.

A recent writer on power development has placed the potential water power of China at 20,000,000 horse-power. Much of this is on the upper Yangtze and inaccessible to localities where it can be used to advantage under present conditions of transport. While the proposed development of Yellow River power on the Shansi-Shensi border is less than one per cent of the total available undeveloped water power of China, it is of great significance because of its availability, being reasonably close to good farm lands that need cheap power for pumping water for irrigation and also convenient for supplying cheap electrical power for industrial development in regions from 60 to 125 miles to the south.

As an engineering undertaking this project rivals many large plants in Europe, Africa and America. There are special problems arising in the study of the design for the most practical and efficient development of this power. The occurrence of ice and silt and extreme fluctuations of flow all tend to complicate the problem. Then there is the question of use in a region which heretofore has never used power of this kind or even steam power except in a very limited degree.

That the benefits of this development would soon be far-reaching and favorably effect the general living conditions and prosperity of the Chinese people in this part of the country is apparent to every student of rural improvements. A part of the power thus developed would go to increase yields of farm crops on the Hotung plain and in the Chiangchow and Hotsin districts in the vicinity of the mouth of the Fen Ho. Such insurance to crops in this locality would not only greatly decrease drought losses but would aid greatly in preventing famine in adjacent territory and even in districts far removed.

Aside from farmers there will be many other users of this new power. Its use in such industries as the Fixation of Atmospheric Nitrogen and its many allied chemical industries will be but a matter of a few years and such use will have a marked effect in benefitting the country thus served. Even the petroleum bearing strata of north-central Shensi may find this power so low priced as to warrant its use in large quantities. Mills for the spinning of cotton yarn are already awaiting the development of this power as also are many municipalities that would use it for lighting purposes. Suitable use may be found for this new power without going far afield. Before many years a greater demand will likely require a further development of the potential power of these falls and the rapids between them and Yumenk'ou.

Preliminary Hydraulic Data

In the usual design of hydro-electric plants, flow duration curves or discharge tables covering a period of several years form the basis for determining the primary and secondary power (power available all of the time and power available only part of the time). These curves combined with the probable load factors indicate, in a general way, the design, performance and probable return on the investment. Past studies of the Yellow River have

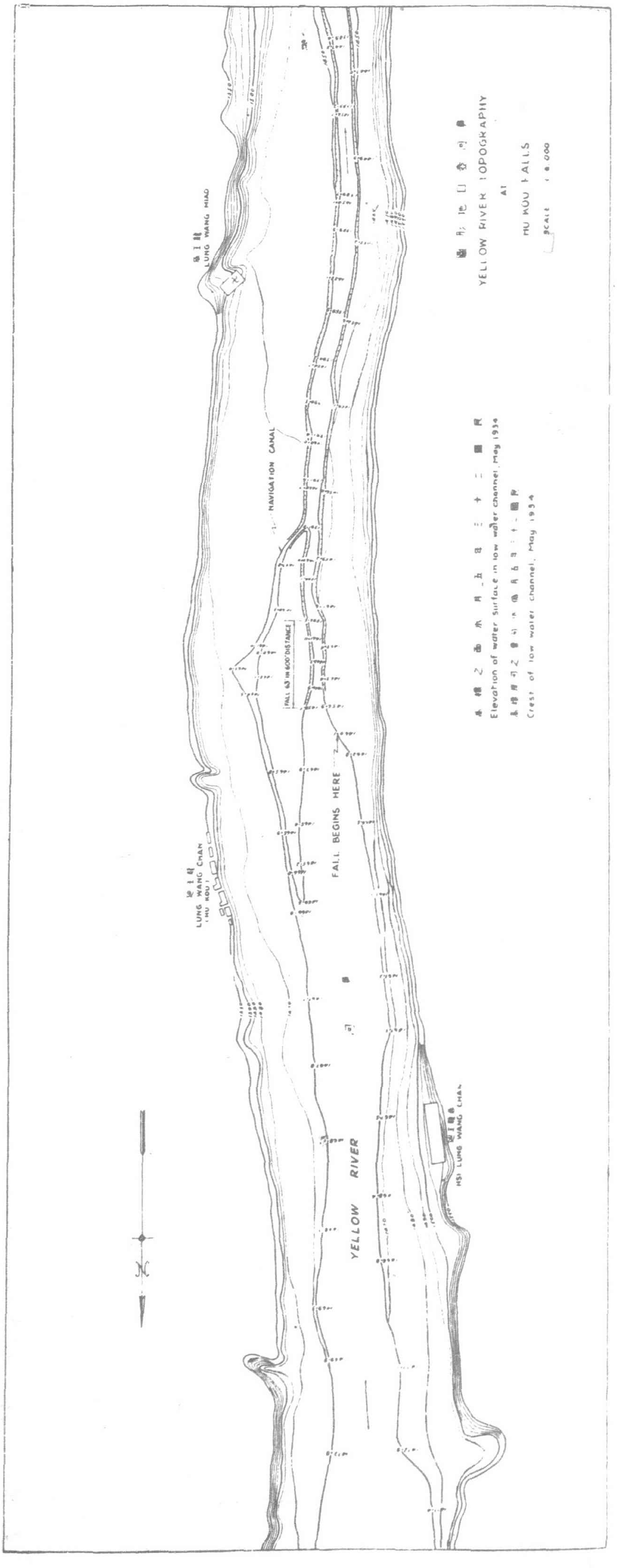
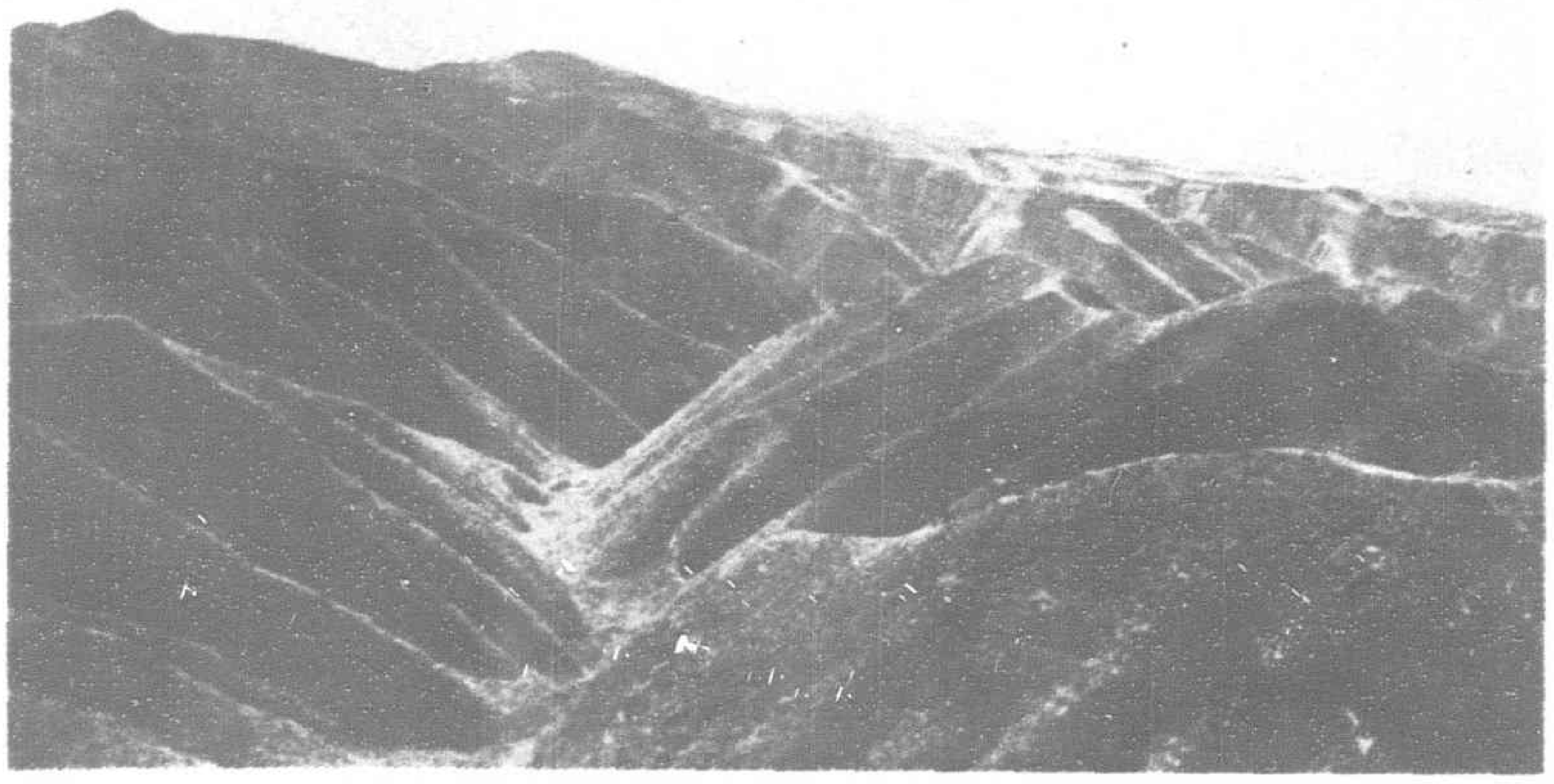


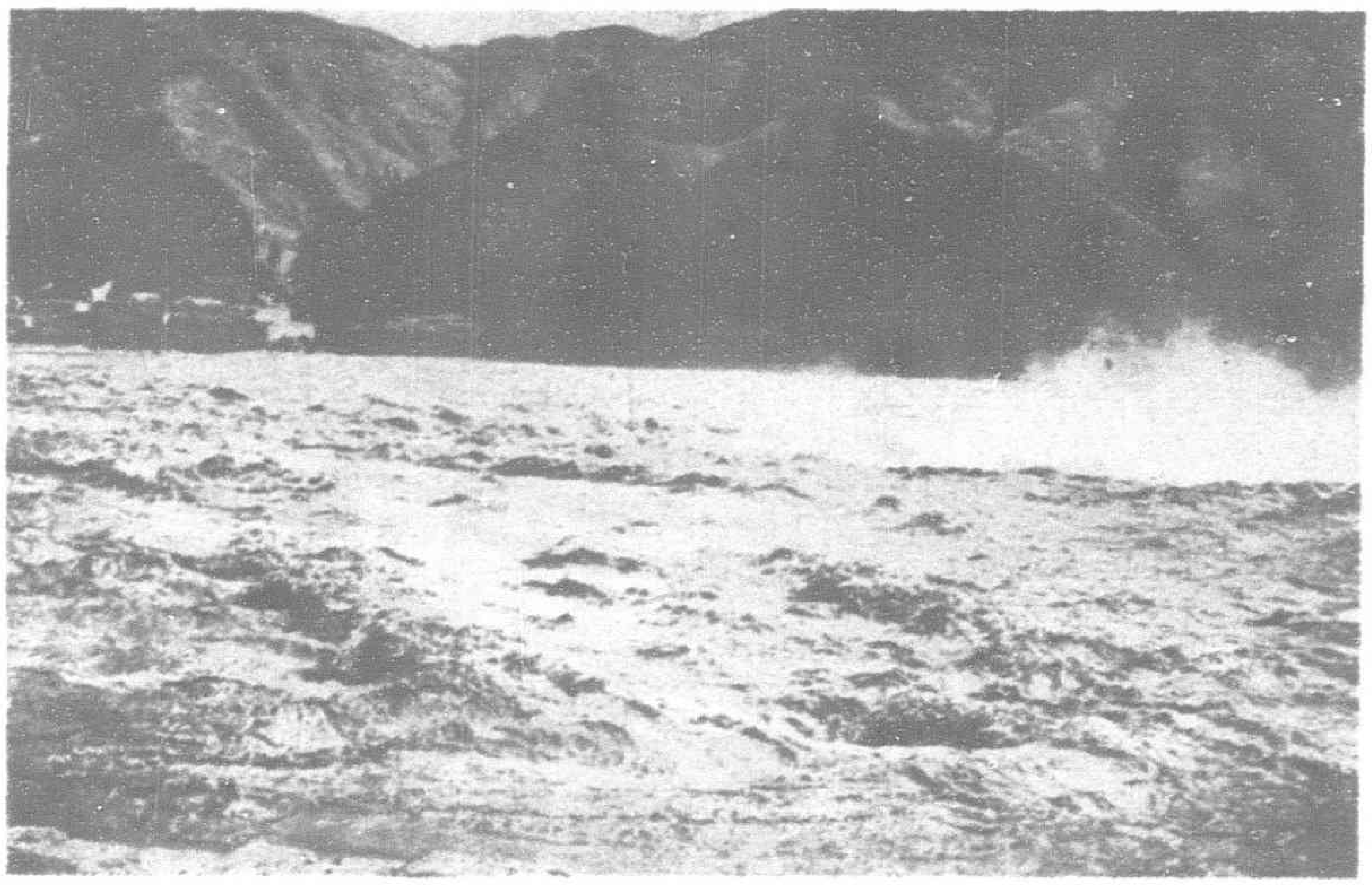
Plate II



Rough country to cover between Chi Hsien and the Hu-k'ou Falls of the Yellow River

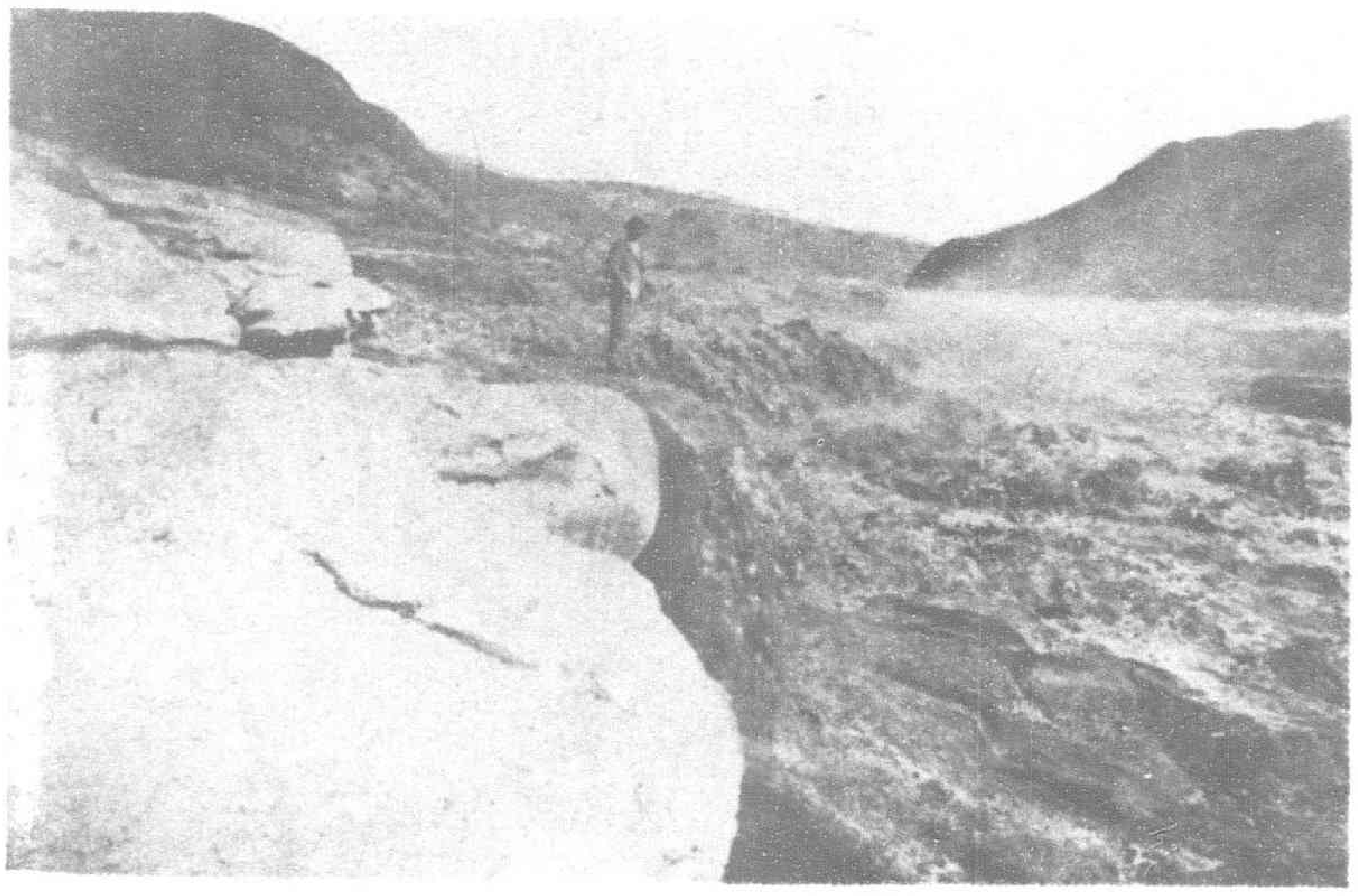
1

not been sufficiently extensive to furnish us with as much detailed information as we would like. However, our engineers have had experience on the design and construction of the Saratsi Irrigation Project for several years past and during that period we have made careful studies of the flow of the Yellow River at the Intake near Tengk'ou, Suiyuan. Our present studies and investigations, therefore, are guided by a conservative comparison with the characteristic curves of the Yellow River at Tengk'ou and such flow data as have recently been gathered by the Yellow River Commission. We base our plans on the best data available from all sources supporting our own observations and measurements on the ground.



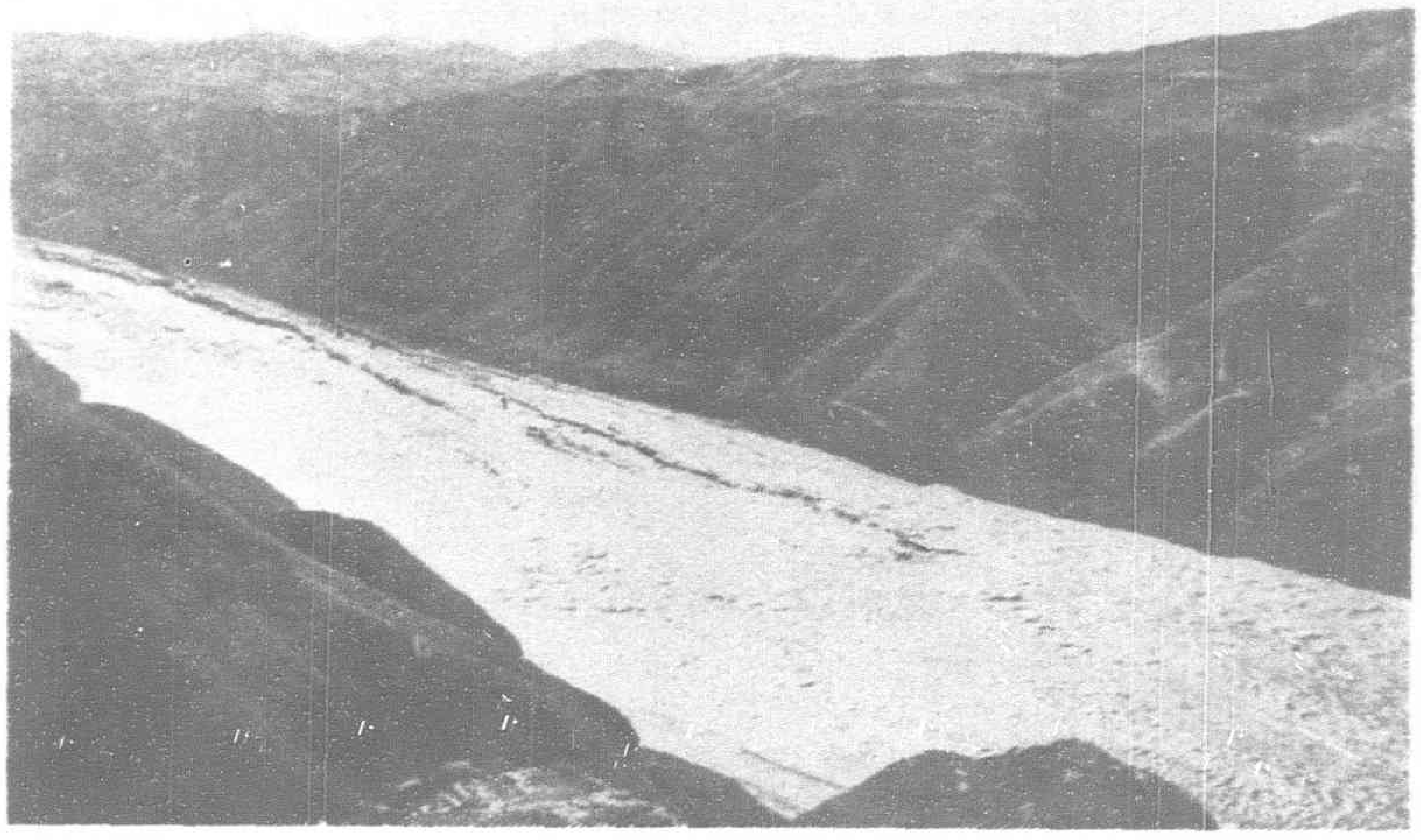
Looking across the Yellow River from the west bank toward Hu-k'ou Village just above the falls

3



Engineer Todd on the lowest western rim of Hu-k'ou Falls, Yellow River

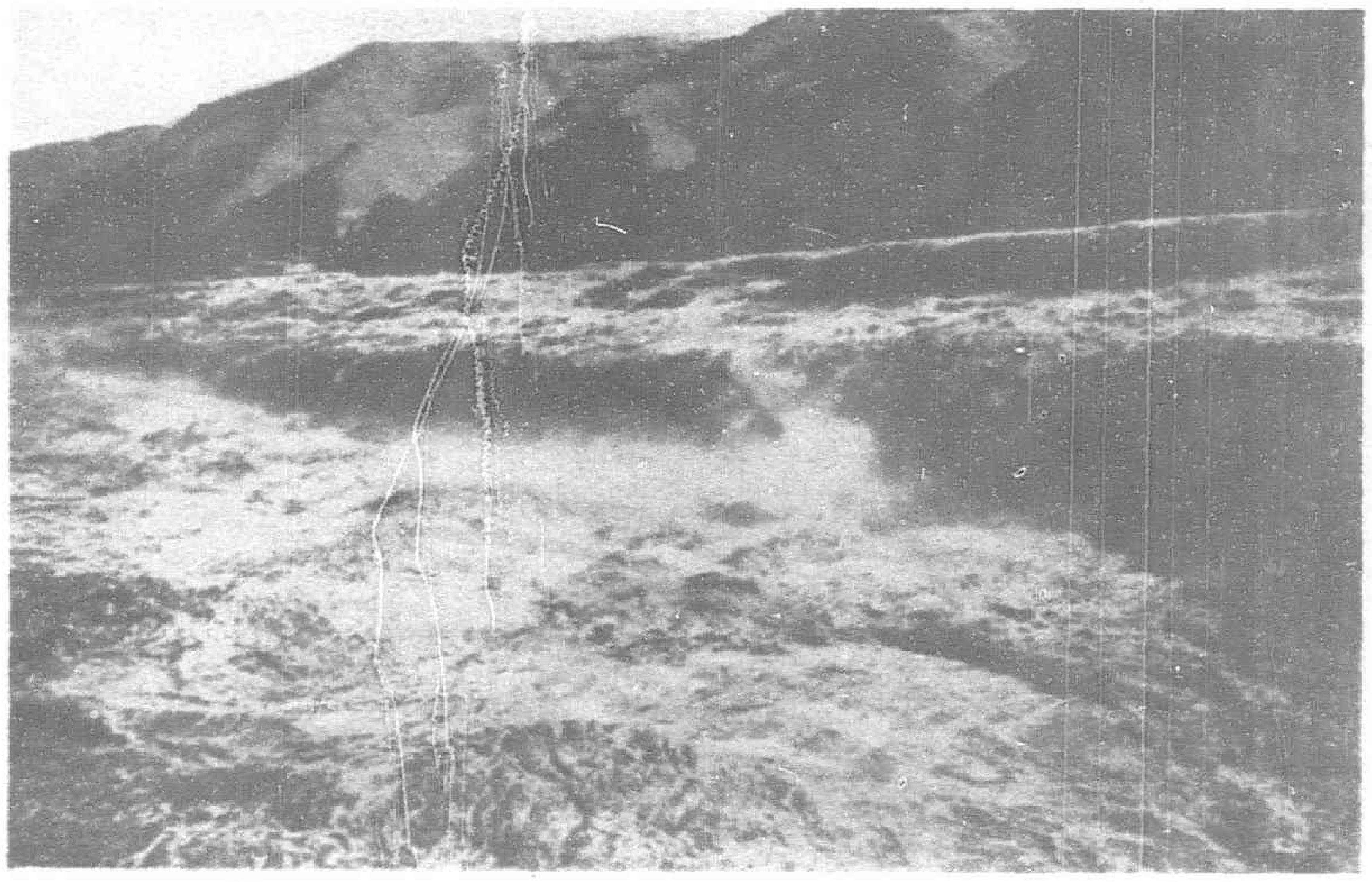
5



Looking down on Hu-k'ou Falls from the trail on the east. Here the Yellow River drops into a deep slot in the Limestone river bed

2

The Saratsi (or Tengk'ou) duration curve indicates a minimum flow of 10,000 second-feet at that point during the comparatively dry year of 1930. The extreme minimum is likely something lower than the 1930 records show for Tengk'ou. But there are other feeders between Tengk'ou and Hu-k'ou, a distance of nearly 400 miles. These other feeders will bring the Hu-k'ou minimum flow up to 10,000 second-feet in the driest years, in our opinion. For the sake of safety the minimum flow at Tengk'ou has been used in estimating the possibilities of these falls.



Yellow River water boiling in the Narrow Slot at Hu-k'ou Falls, October 25, 1934

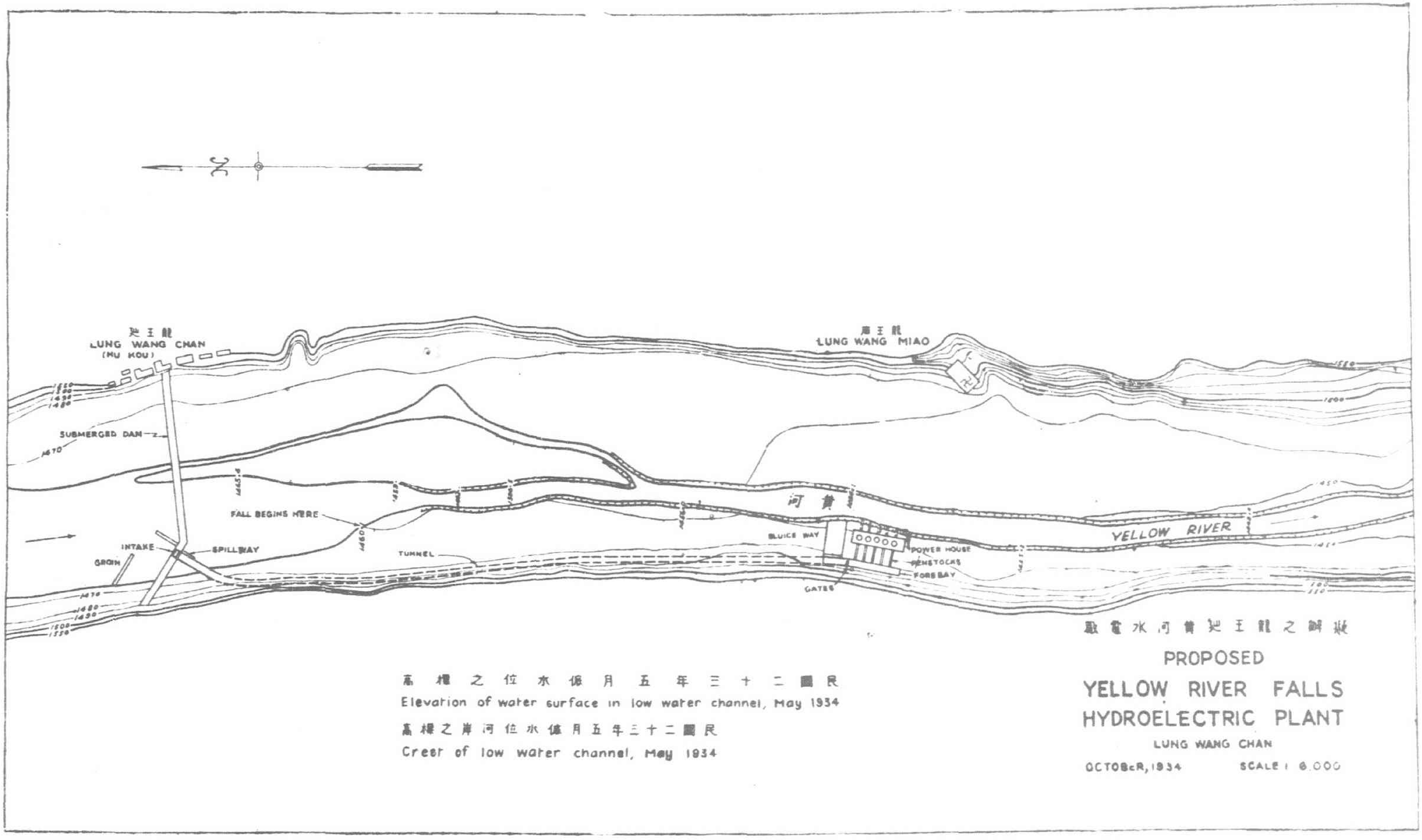
4

With no other dependable flow data than that which our own engineers have gathered at Tengk'ou in recent years we are justified

At the Power House Site one mile below Hu-k'ou Falls on Yellow River

6

PLATE III



in basing our estimates on those results which indicate the following assured flow for Hu-k'ou:

Minimum flow=10,000 second-feet, primary power
Average flow=30,000 second-feet, secondary power (available eight months per year).
Flood flow=130,000 second-feet, not all available without storage.
Maximum Flood flow=360,000 second-feet (few days duration only).

At the power site at the Yellow River Falls measurements show that a head of a little over 100 feet can be obtained by use of a diversion dam 30 feet high and by going down stream 5,000 feet for the power plant installation. The difference in available head between low and high water periods will be approximately 20 feet. In developing 50,000 horse-power in the first step little over half of the low water flow of the river will be used.

$$HP = Q \times H/11$$
$$50{,}000 = Q \times 100/11$$
$$Q = 5{,}500 \text{ second-feet flow.}$$

Plan of Development

The general plan of developing these falls is to divert something over half of the low water flow of the Yellow River by means of a

PLATE IV

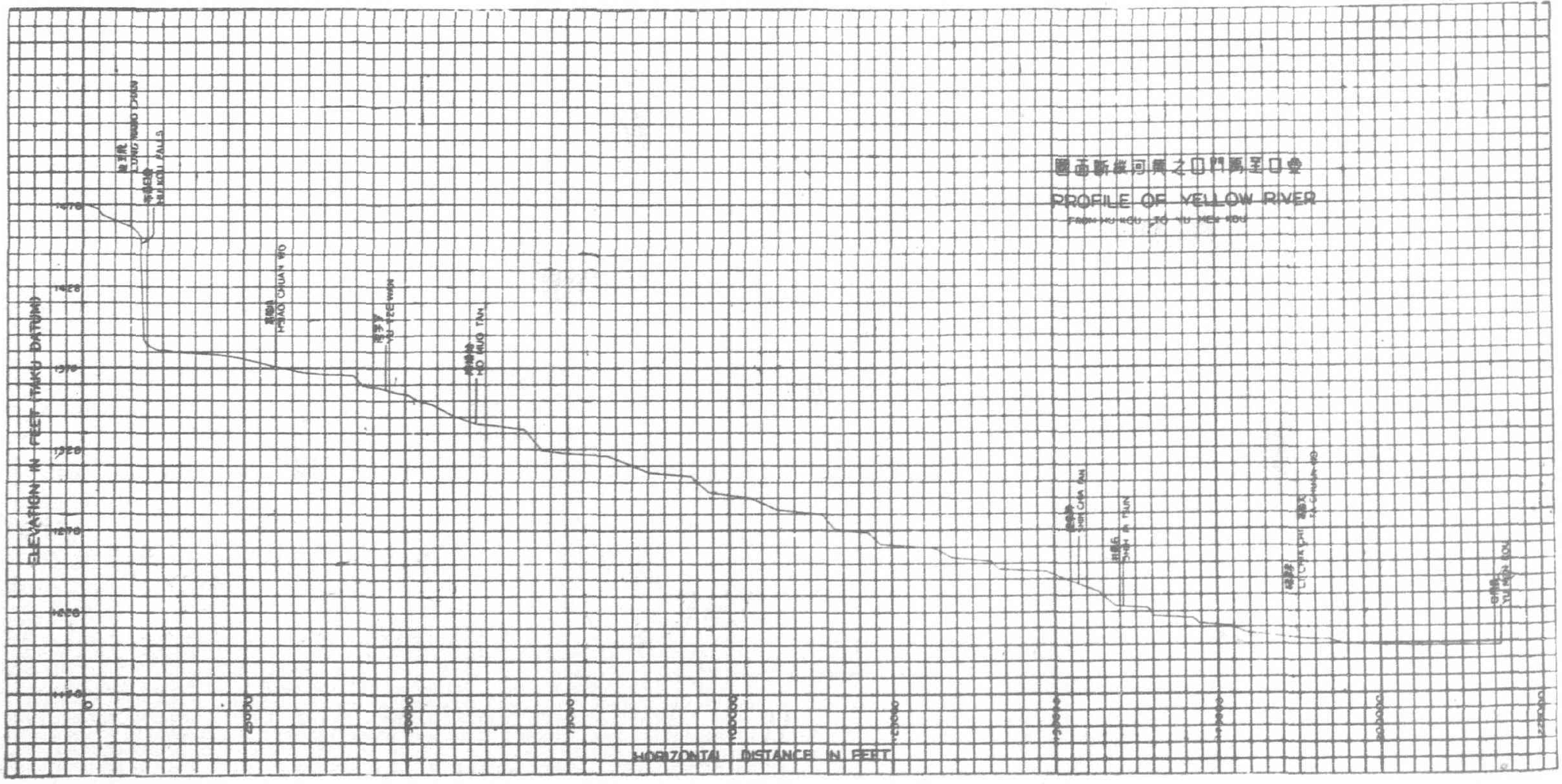
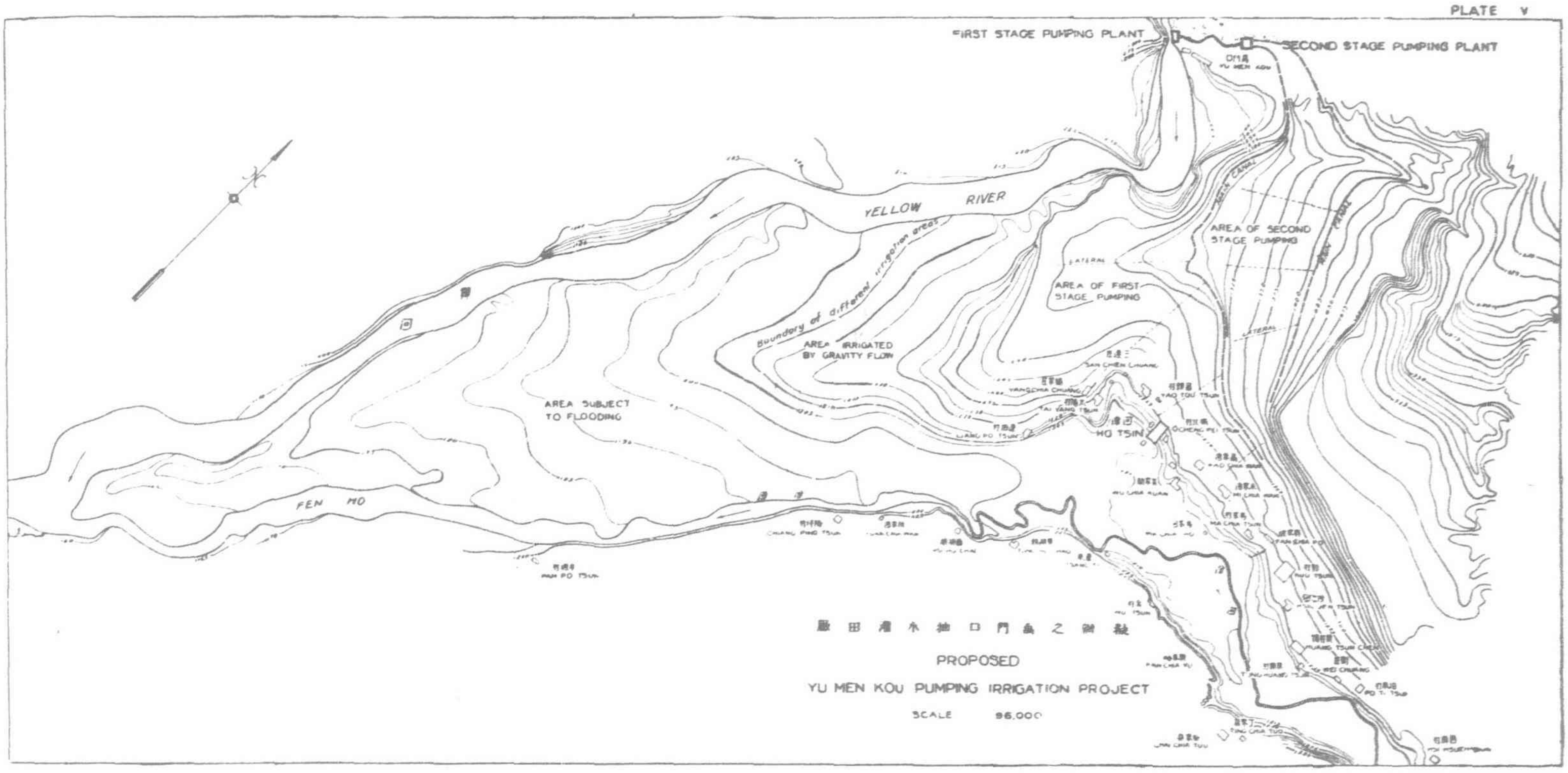


PLATE V


FIRST STAGE PUMPING PLANT
SECOND STAGE PUMPING PLANT
YU MEN KOU
YELLOW RIVER
MAIN CANAL
AREA OF SECOND STAGE PUMPING
LATERAL
AREA OF FIRST STAGE PUMPING
Boundary of different irrigation areas
AREA IRRIGATED BY GRAVITY FLOW
AREA SUBJECT TO FLOODING
SAN CHIEN CHUANG
YANGCHIA CHUANG
TAI YANG TSUN
LIANG PO TSUN
HO TSIN
YAO TOU TSUN
FEN HO
CHANG PING TSUN
擬辦之禹門口抽水灌田廠
PROPOSED
YU MEN KOU PUMPING IRRIGATION PROJECT
SCALE 96,000

low head masonry diversion dam of over-flow gravity type into a short open canal head race and then through a tunnel more than 4,000 feet in length to a forebay and through five penstocks to an equal number of turbines, then discharging the water through draft tubes directly into the river.

The plant for this first stage of development will be of 50,000 horse-power capacity or approximately 37,300 kilowatts. There will be five units of 10,000 h.p. each. Propeller type turbines having adjustable pitch blades are to be used in order to maintain maximum power production during flood periods when high tail water causes certain losses in head. This rather modern type of turbine is so designed as to be free from danger of destruction of shaft bearings by gritty river water when the silt load is heavy.

The available head has been taken as 100 feet, though in low water there will be 122 feet and in high water 102 feet inclusive of that created by a diversion dam with crest 30 feet above low water surface. For a 50,000 h.p. installation this will produce 438,000,000 horse-power hours or 326,748,000 kilowatt hours in a "no shutdown year" of 365 days running 24 hours per day.

The dam is to be located about 600 feet above the falls. It will have a slight angle up stream where the intake is to be located in order to induce flowing ice to shear away from the gates, rake and racks. Also it will tend to divert silt from the locality of the intake. This structure will be cyclopean masonry with rich concrete on the outer two feet throughout to protect it against abrasion from ice and large rocks carried down stream in high water. Also heavy steel rails will be imbedded near the surface of the top face and crest as further insurance against damage particularly from ice flows.

The length of the crest of the dam will be approximately 1,300 feet provided with ample spillway section to handle extreme flood flows. It will be imbedded five feet into good rock foundation. The greatest height of section will be 45 feet at mid-channel. Chutes will be built on the east side of the river valley to put cargo boats over the dam, thus improving present difficult conditions of portage.

As to the rock structure at the dam site our Geologist makes the following statements after a careful survey of the locality. "The foundation material consists of Ordovician sediments of limestone and shales. The limestone is further differentiated as a calcareous grit (or sandstone) on the higher elevations above the river. Although no borings have been made as yet a surficial inspection indicates a fairly thick layer of limestone at the elevation of the dam site which will provide an adequate foundation and anchorage for the structure."

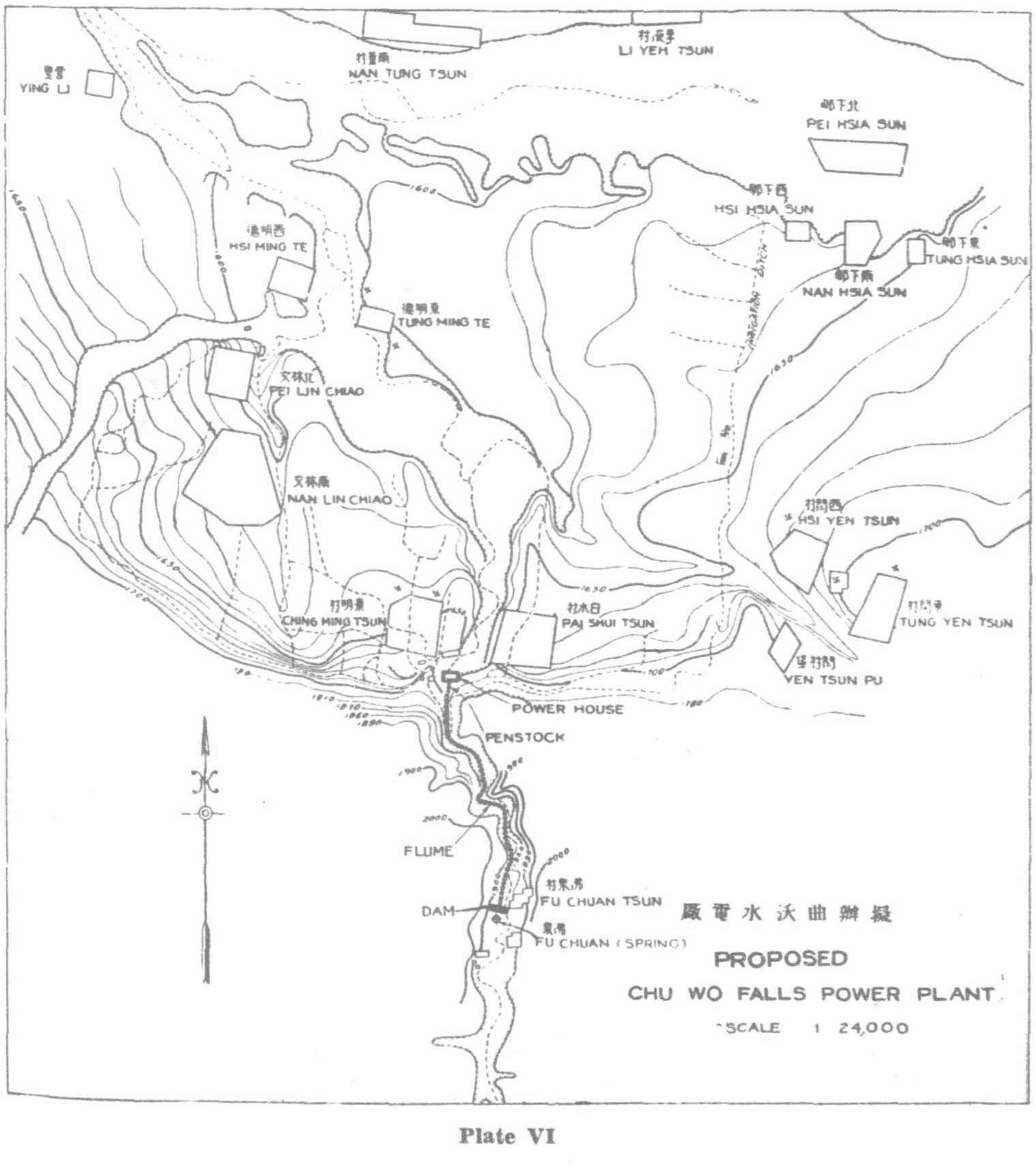


Plate VI

(To be continued) P.140 (APRIL 1935)

"The Second Doorway of the Wide World's Trade"*

An interesting account of the Royal Air Force in that vast area which comes under the air control of the Far East Command was given in a Lecture on "The Royal Air Force in the Far East" by Group Captain A. C. Wright, A.F.C., at the Royal United Service Institution on January 30. Air Vice-Marshal P. B. Joubert de la Ferté, C.M.G., D.S.O., was in the Chair.

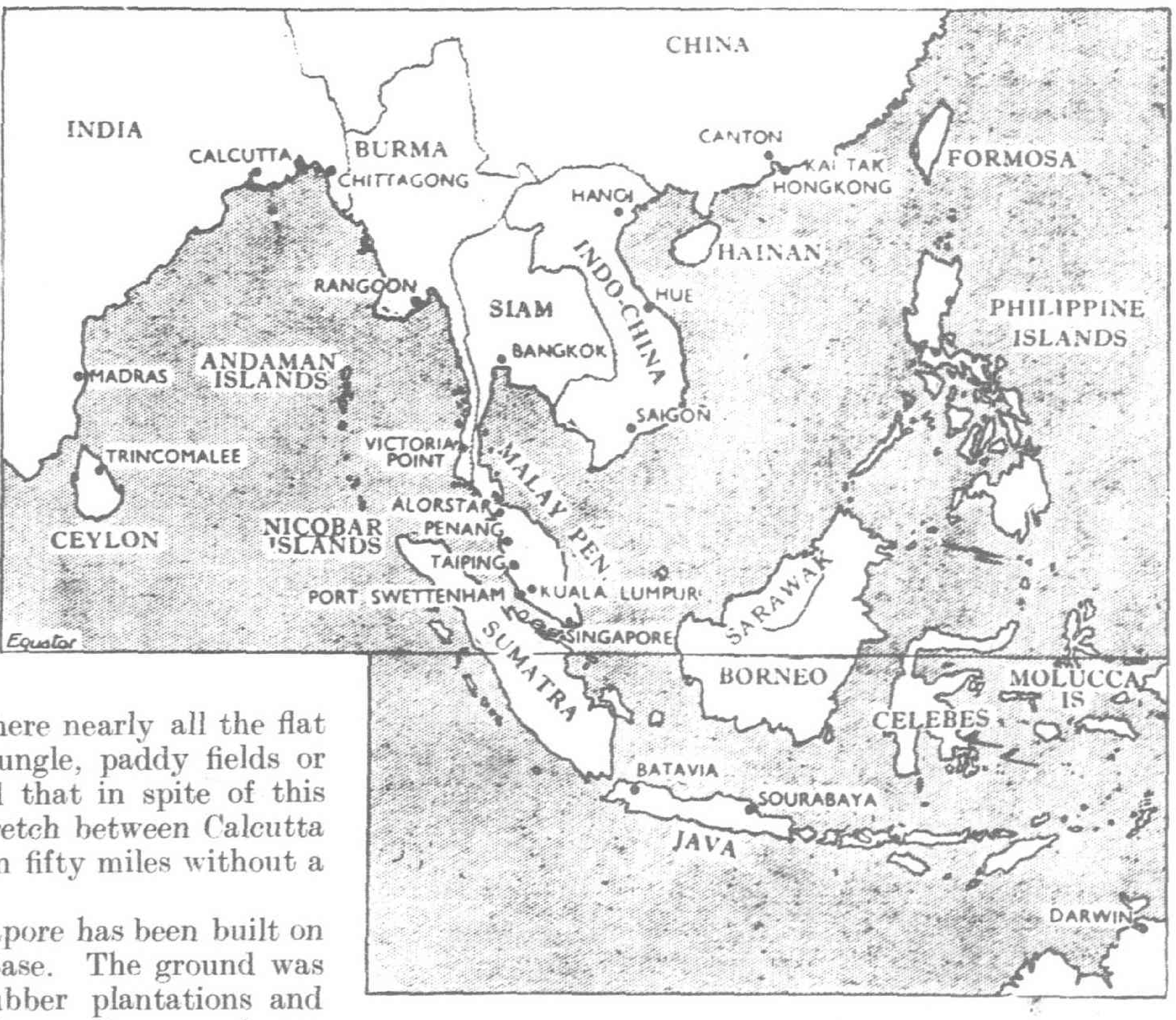
Group Captain Wright said that British interests in the Far East were centred in Singapore and a 2,000 miles' radius from there included Calcutta, just missed Shanghai and took in Port Darwin. If British interests were to be protected over this area air communications must be developed and aerodromes maintained.

In 1926 the Royal Air Force had made a preliminary reconnaissance of the air route to Singapore, and in 1927 the Far East Flight, four Supermarine Southampton flying-boats (Napier Lions) under Group Captain H. M. Cave-Brown-Cave, C.B.E., D.S.O., D.F.C., flew from England to Singapore. After re-fitting at Singapore the Flight went by way of the Netherlands East Indies to Australia, flew round Australia and back to Singapore. The Flight again re-fitted and flew by way of Borneo and the Philippine Islands to Hongkong and back to Singapore.

They left England in October, 1927, and completed their reconnaissance of the main areas in the Far East Command in September, 1928. They made reports on all possible anchorages and their task will not easily be equalled.

Anchorages and landing sites were few and far between and many places could only be visited by flying-boat. After a preliminary survey from the air they would select anchorages and from these survey for landing grounds.

The Lecturer described the difficulties of making landing grounds where nearly all the flat spaces were covered with jungle, paddy fields or mangrove swamps and said that in spite of this there was now hardly a stretch between Calcutta and Singapore of more than fifty miles without a landing ground.



The aerodrome at Singapore has been built on a site close to the Naval Base. The ground was originally coco-nut and rubber plantations and swamp. Trees were cut down, the ground was levelled and thoroughly drained. The aerodrome is now 1,000 yards long, slightly domed and covered with grass. In spite of all this the climate is such—it has a rainfall of 100-ins. per year—that the whole landing-ground is sometimes under water. Hangars have been built and barracks specially designed for the climate, and there are playing fields, tennis courts and gardens laid out.

In December 1930 the Air Force strength at Singapore was increased by No. 36 (Torpedo Bomber) Squadron, which was shipped from England to Karachi and then flew to Singapore. The establishment was further increased to include a Head Quarters unit.

In the meantime the Far East Flight had become No. 205 (Flying-Boat) Squadron. As the function of the flying-boat is to search for and shadow the seaborne enemy and that of the torpedo-bomber squadron is to attack and destroy the enemy, Singapore has the nucleus of an air defence force.

At the same time the R.A.F. base at Kai Tak, Hongkong, which is the base for aeroplanes carried by the Fleet in the China Seas, came under the Singapore Head Quarters, which eventually became the Far East Command. In 1934, No. 100 (Torpedo Bomber) Squadron was added to the establishment.

Every opportunity is taken by the R.A.F. at Singapore to co-operate with His Majesty's ships passing through, but as these are so few and far between, arrangements are made for co-operation with Blue Funnel and other liners, the Commanders of which give every possible help to the Air Force. The Lecturer explained that this sort of training was better than nothing, although the merchantmen could not take evading action without hindrance to their normal duties.

Ships are difficult to spot by night because there are low clouds and rain every evening. There is a close liaison between the Army and the R.A.F., and if possible exercises in which all three arms take part are held every year.

The exploits of the *Emden* in the Bengal Sea during the War 1914-18 directed attention to the Andaman and Nicobar Islands, but up till 1931, except for one seaplane, which made a forced landing from a cruiser, no aircraft had been seen by the islanders. In 1931 a survey was made by flying-boats from Singapore.

The Lecturer described how an attempt to convey petrol from Rangoon to Nicobar by a Burmese junk failed because the junk sank, but later a Chinese junk took a supply of petrol from Penang to Nankiri and the flying boats were able to begin their survey.

Their method was to fly over a proposed anchorage and make a sketch map of underwater rocks and shoals, then alight on a safe patch of water, and from there make a plot of soundings. They discovered that no landing grounds could be made on the islands without great cost. In the few places where there was grass it was ten feet high.

They made the discovery that the valuable timber with which the islands abound can be easily mapped from the air and its type and quality described. They also discovered that they could locate and report unlicensed and therefore unnumbered junks harvesting toca shell. The survey took 45 days and 17,000 miles were flown.

The next big flight by the flying-boats from Singapore was to Australia, where they co-operated with two squadrons, one fighter and one bomber, of the Australian Air Force. On their way out they were met and escorted by a Squadron of the Royal Netherlands Air Service for a few miles.

Speaking of the work of the land-planes at Singapore, Group Captain Wright said that the torpedo-bomber squadrons were the striking force and needed a very high standard of technical training. There had been a certain amount of difficulty over the bombing ranges because the Malay fishermen had objected. In practice, however, the damage to the fisheries was practically nil with live bombs,—and absolutely nil with practice bombs.

He explained how the torpedo-bombers had to come along at 10,000 feet and dive on their target, and that a very high standard of accuracy was required.

(Continued on page 119).

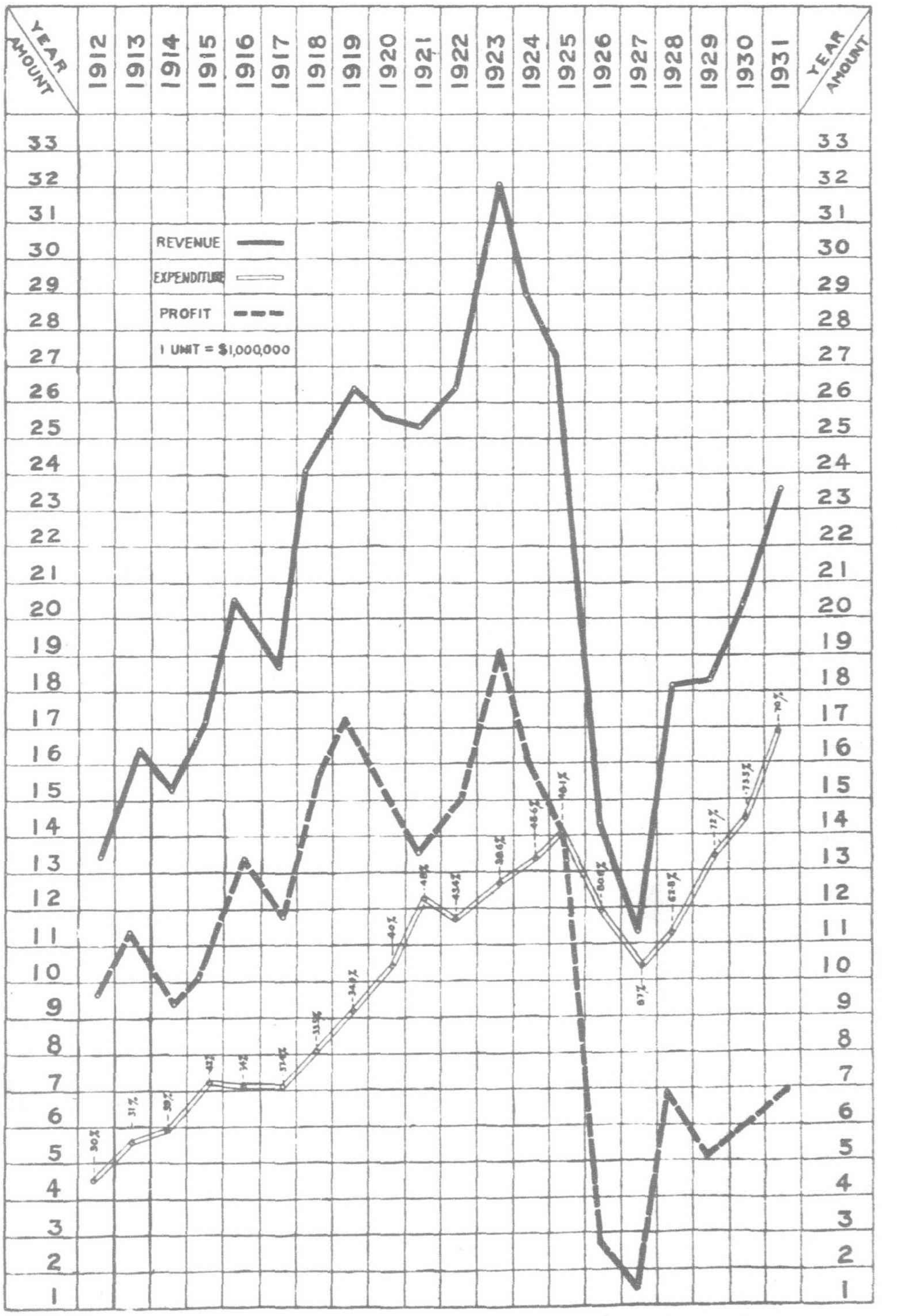
**The Aeroplane.*

The Peiping-Hankow Railway*

By JICK G. WONG, Chief Engineer, Peiping-Hankow Railway

The history of the Peiping-Hankow Railway dates back as early as 1887 when the Naval Authorities of the Imperial Ching Dynasty petitioned the Government to construct The Tientsin-Tangku and the Lu Kiao Chiao-Paotingfu lines. Lu Kiao Chiao is situated 15 kilometers south-west of Peiping while Paotingfu is 131 kilometers further south. Paotingfu in those days was an important city as it was the capital of Chihli Province. On account of the importance of reaching a seaport the line from Tientsin to Tangku was built first and this short line later became a part of the present Peiping-Mukden line. The whole Peiping-Mukden line was completed in 1897. As money was not available the Lu Kiao Chiao-Paotingfu line was delayed until after the Sino-Japanese War when our people began to realize the great value of modern means of transportation and railway construction became the main topic of the day. Eventually H. E. Sheng Kung-po was appointed Director-General of the railway in October, 1986 and a sum of taels 13,000,000 was allocated from government funds for the construction of the Lu-Pao section. This was the beginning of the Peiping-Hankow Railway. Viceroy Chang Chih Tung of Hupeh who was the most progressive man of his time strongly recommended the construction of the line to Hankow and the Government accepted this idea and gave the necessary authorization. Delegates were appointed to canvass the country for subscriptions. The attempt to induce the people to take up shares in the Railway Company ended in failure and the only means left was by foreign loan. Consequently the American financial group headed by Senator Washburn and the British financiers were approached but as the British desired to include the Canton-Hankow line they were dropped and the negotiations continued with the Americans. An American engineer, Capt. Rich, was sent to make a preliminary survey and estimate, starting out from Hankow. While the Americans were bargaining for favorable terms the Belgian financiers appeared on the scene and the whole situation was changed over-night by the Belgian offer. The Belgians offered to sign a contract at China's terms so their offer was accepted and the Director-General in petitioning the Throne stated that as Belgium was but a small country and far away we had nothing to fear from them and also their terms were very favorable to China. The preliminary agreement was signed at Wuchang on May 27, 1897, and two months later on July 27 the final and detailed agreement was signed at Shanghai. Although greatly opposed by the British and American interests the agreement was ratified on August 12 of the same year. The combined influence of Li Hung Chang and the French and Russian Ministers pulled the case through. After the ratification of this agreement the British demanded and obtained concessions for the Canton-Kowloon, lines radiating from Shanghai, and lines in Honan and Shansi Provinces. The loan was for £4,500,000 issued to the railway at 90 but was sold in the market at 97. The security for the loan was the railway itself. It was agreed to complete the line in five years and Belgian engineers were appointed and work started in the following year.

Before the first payment of the loan there occurred the German occupation of Tsingtao on November 14, 1897, which placed the Imperial Court in an embarrassing position. This was the opportunity they were waiting for and the Belgian Company demanded and obtained revision of the agreement with most liberal terms. The revised agreement also gave the Belgian Company wide powers. Among the liberal terms may be mentioned: a 20 per cent of surplus as their profit, during the period of the Loan Agreement, full control of the operation, power of selection of the personnel, a five per cent commission on material purchase and in case of deficit same to be made up by the Railway Company.



Comparison of Revenue and Expenditures (1912 to 1931 Inclusive)

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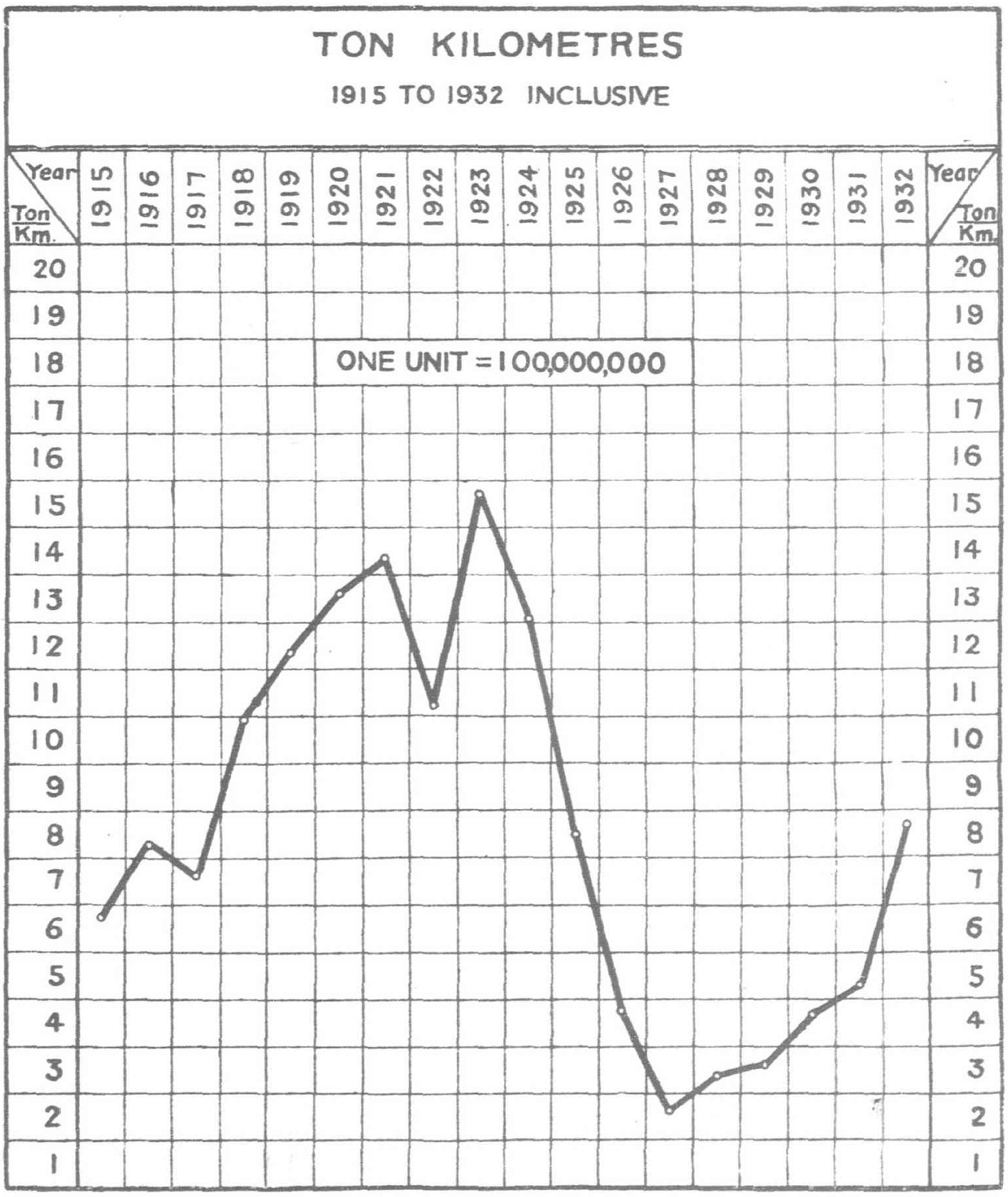
* *Journal of the Association of Chinese and American Engineers*

While all these negotiations were going on the Director-General had arranged for the construction of the Lu-Pao section not daring to delay any longer. It is of interest to note that the Lu-Pao section was surveyed by Mr. Kinder, the Chief Engineer of the Peiping-Mukden line, and a British engineer named T. J. Bourne was the Resident Engineer in direct charge of the work. It is to their credit that this section was substantially built,—all bridges were founded on sound foundations, the whole section was built for double tracking including the bridge masonry, and the steel superstructures of the bridges are strong enough to carry our heaviest locomotives to-day. With the exception of 30 miles of British Sandberg rails this section was laid with rails from the Hanyang Iron Works.

In 1905 a supplementary loan of 12,000,000 francs was added to the loan. In order to cancel the liberal terms of the loan the Government made a new loan of £5,000,000 from the Hongkong and Shanghai Banking Corporation and the Banque de l'Indo-Chine with which the Belgian bonds were redeemed and the Belgian Company repaid in full including their 20 per cent profit from the operation. This new loan was secured by sundry taxes of the provinces of Chekiang, Kiangsu, Hupeh, and Hopei. It is of special interest to note that the railway itself was not pledged for the new loan. Accordingly on January 1, 1909, the railway was handed back to China. Up to the end of September, 1932 a sum of £3,250,000 had been repaid to the two banks and the debt is being paid gradually by the Central Government.

On account of the fact that the railway was being financed by a Belgian Company the damages suffered by the railway during the Boxer trouble were assessed at 50,717,000 francs and this sum became the share of the Belgian Boxer Indemnity Fund and is to be payable in 39 years.



Ton Kilometers 1915 to 1932 Inclusive

The whole railway was completed on November 15, 1905, and put into operation. The railway cost approximately £7,000 per mile. At first it was known as the Lu-Han Railway as it did not reach Peking, but as a result of the Boxer trouble the 15 kilometer section to Peking was completed due to the influence of the Allied commanders and so the line became known as the Peking-Hankow Railway.

The line is 1,208 kilometers from Peiping to the Hankow Station with another six kilometers to the Han River, or 1,214 kilometers (755 miles) from end to end of the main line.

Engineering Features

There are two main engineering features, the many bridges of which the Yellow River bridge is the most outstanding as it is one of the longest bridges of the world, and the difficult construction of the line through the pass at Wu Sheng Kwan including a tunnel through solid rock. We have over 970 bridges of spans over two meters besides numerous culverts.

The Yellow River bridge is 2,934 meters between abutments and is composed of 52 spans of 21 meters in the middle and 24 spans of 31 meters at each end, totalling 100 spans. Originally there were 102 spans but the two end spans at the north were taken off and used for replacing some damaged spans of the same bridge. The construction of the Yellow River bridge was started in June, 1903, and completed in May, 1906, although traffic was allowed to run over it in October, 1905. The piers of this bridge are of novel design, being made up of clusters of steel screw piles instead of the usual masonry. These piles were driven down to about 14.5 meters below the river-bed. They were hollow and came in two meter sections which could be bolted together. When the piles were screwed down to their required depth the inside hollow space was filled with a poor mixture of concrete to prevent rusting and also for adding weight for anchoring the piles. During the 1933 flood the scour was as deep as 10 meters so that many of the piles were holding on with but five meters in the sandy soil. This severe scouring caused many piles to be exposed and the bridge was consequently swaying and shaking with the strong currents. It was with the greatest luck that we were able to rush stone in in time and in sufficient quantity to plug up those holes around the piles and thus were able to prevent the bridge from collapse. The 1933 flood level was the highest on record and exceeded all previous high records by over two meters. At the same time the lowest water level record was broken, caused by the breaking of a dike down stream which flooded the lowlands and the water in the channel at our bridge dropped two meters within 24 hours on August 11, 1933. This sudden drop of the water was the principal cause for the very deep scouring which nearly destroyed our bridge. If you will imagine a stretch of water 3,000 meters long dropping suddenly by two meters within 24 hours you can readily see what tremendous forces were acting on those piers and it is a wonder that the bridge could withstand such strong forces. The steel superstructure of the Yellow River bridge is in very fine condition and in fact much better than most bridges on the rest of the line. Our problem is only to safeguard the foundation of these screw piles and see that they are not undermined by the currents and exposed to danger. So long as we have no violent currents the bridge is reasonably safe. Special precautions are taken with regard to this bridge. Every train before crossing must be minutely examined and the speed when crossing the bridge is restricted to about nine kilometers per hour, thus taking 20 minutes for crossing the 3,000 meters. We have a special crew of men whose sole duty is to examine daily all details of the bridge and see to repairs when anything out of order is discovered. With all these precautions we are doing everything possible to protect the bridge. On account of the age of these screw piles there is a danger from breaking when under strong pressure from the currents during flood time. However, so far no serious signs of cracks have been discovered.

The bridge was built at a cost of $2,650,000.00 local currency and was guaranteed by the builders for 15 years but that time limit has long passed. In 1920 tenders were received for a new bridge having foundations reaching to a depth of 25 meters below the river-bed with masonry piers. The bridge was to be 40 spans of 67.5 meters with a short 12 meter span at each end, a total length of 2,800 meters. The accepted tender was $10,881,297.00 but due to civil wars and other disturbances the new bridge was never started as the money set aside for the bridge was shifted to other uses. As there is practically no navigation passing our bridge excepting small native boats and as the soil is uniform throughout, composed of nothing but sand to a very great depth, the bridge can be of any span length. The least number of piers will be the most suitable as there will be the least danger from scouring and less obstruction to flow. At present day prices we have estimated that a new bridge including proper stone training works, new approaches, etc., will cost in the neighborhood of $7,500,000.00. The tonnage of steel for the superstructure will be approximately only 10,000 tons, so it is seen that the greater part of the cost for a new bridge is in the deep foundations for the masonry piers and the other work in connection with the new bridge.

Although we have so many bridges, yet with the exception of the Yellow River bridge we have no really large bridges in the conception of large bridges in foreign countries. We have only three spans of 60 meters near Hankow just north of Seven Mile Creek and only a total of eleven 40 meter spans. Our greatest problem is in the 30 meter bridges of which we have 232 spans. These bridges were designed under old methods and are weak in their details and therefore very unsuitable for our present heavy, powerful engines. The only way we can maintain traffic with such a large number of weak bridges is by limiting the speed over them. As an idea of our requirement in bridges, if we were to change them to their proper strength as required by our present standards we would need about 50,000 tons of steel bridges.

The Wu Sheng Kwan Pass is situated near the boundary between Honan and Hupeh. At the peak of the grade there is a tunnel through solid rock cut out for double tracking and 341 meters long. Wu Sheng Kwan station is the summit of our grade and is 160 meters above Hankow. To reach this elevation we have a steep gradient of 1.5 per cent, that is, a rise of 15 meters in 1,000 meters (without reduction or compensation for curvature). In order to pass over this steep grade freight trains are divided into two sections at the foot of the grade and a helping engine added. Our passenger trains need not be divided into two sections but the helping engine is required. These helping engines are located at Tung Huang Tien for north bound traffic and at Li Kia Chai for south bound traffic. From this you can see that this section of the line is like the neck of a bottle and its capacity will limit our traffic in the future. On account of lack of facilities for the shunting and handling of engines at the Li Kia Chai station we have recently built a new station at km. 1,024 and abolished the old Li Chia Chai station which was also too near the foot of the grade with the result that often times the train on the downgrade over-ran the station. The Tung Huang Tien station on the south side of the pass has the same danger of having trains over-run it and in the coming year we are expecting to move this station further south. On account of the danger from overrunning the station all trains have to wait until the downgrade train has come to a stop before leaving the adjacent station. Of course such waiting further limits the capacity of this section. Now with this new station at km. 1,024 trains need not be classified at Sin Yang Chow (km. 996) which station although having seven tracks is often times congested due to occupation of many of the tracks by military trains. We realized long ago the great necessity of improving the operation of this section and gradually we are planning and carrying out improvements as money is available. There is a second steep grade (km. 987) just north of Sin Yang Chow but the trains there need not be divided up as the length of the grade is not very long. A helping engine is however required. For this stretch we have a plan for reducing the grade which we hope to be able to carry out before very long. At the new station at Km. 1,024 we have provided for sufficient tracks for shunting, turntable for turning the engines, a shed for housing the helping engine, coaling and watering platform, etc. Besides the above two places where we have steep grades and helping engines the rest of the line has comparatively easy grades.

Organization

This railway is operated under the Departmental System, headed by a Managing Director and two Assistant Managing Directors, and having the following Departments :—General Affairs, Traffic, Engineering, Locomotive, and Accounts. At present there is also a Police Department which was formerly a sub-division under the General Affairs Department but recently all railway police are directly under a central administration at Nanking in the Ministry of Railways. This move is supposed to be an improvement in the management and direction of all railway police. There was also a Chief Auditor with staff but recently the office was abolished as a mark of confidence in the present management.

Under the General Affairs Department we have the Divisions of Material Purchase, Stores, Medical and Hospitals, Documentary and others that are not classified. The Engineering Department takes care of the maintenance of the road-bed, bridges, buildings, tracks, station appurtenances and other structures. The Locomotive Department repairs all locomotives and wagons and has charge of the two main shops. The Accounts Department handles all money, receiving and paying out. The Traffic Department operates the trains and does the business part and is therefore the revenue producer. Upon the Traffic Department we depend to get our revenue and its efficient management or mismanagement will be quickly reflected in the returns of the revenue.

In other countries you do not have the railway police but in China we have to maintain a large force of men to police the line and their cost is rather high. In recent years our Police Department has cost us approximately $1,300,000.00 each year.

Revenue

The gross revenue reached a peak earning in 1923 at $32,000,000.00. In those days the Government transport was not so much so the figure shown is very close to the actual cash returns but in recent years the Government transport has increased tremendously. Last year it was charged at about $7,000,000.00. Our normal revenue is also affected by shortage of rolling stock. From the chart you can see how our revenue has decreased since 1923. Perhaps the greatest cause is due to civil warfare, generally starting at some point along our line so that this railway is always affected at the first sign of trouble. It is to be noted that the chart of revenue does not show the true relative volume of business done because in recent years the rates have advanced greatly, until in 1928 the increase in rates was about 60 per cent higher than the 1923 rates. However, since 1928 the rates have been reduced but still are 31.54 per cent higher for first class goods and 48.65 per cent higher for sixth class goods than the 1923 rates. The freight business forms about 60 per cent of the total business done. The passenger business is about $7,000,000.00 in recent years. These figures refer to the cash business done.

The rates which are used make a very great difference. Taking 1923 tonnages and 1933 average rates we get a tremendous total of $44,000,000.00 for revenue. But taking the 1923 rates and the 1933 tonnages we get but a very small total of $12,000,000,00. From the record of tonnages we find that we are to day doing but 56 per cent of the volume of business done in 1923.

Expenditure

The general expenses are those that do not come under any of the Departments, including all salaries and allowances, bonuses, office expenses of the Managing Director, Chief Accountant, and their staffs, store keepers, medical and sanitation work, legal advice, gratuities and policing. For 1931 it was over $5,100,000.00 and is the highest charge as compared with other allocation charges.

The traffic expenses are those incurred by the Traffic Manager's office, and by the station forces, for salaries and allowances and supplies. For 1931 it amounted to $2,300,000.00.

The running expenses are those that cover the cost of operation of trains, including the cost of locomotive fuel, lubricants, wages of employees on trains and engines. For 1931 it amounted to $3,200,000.00.

The maintenance expenses are those that cover cost of repairs to rolling stock, machinery and plant. For 1931 it amounted to slightly over $3,200,000.00.

The maintenance of way and structures are those for cost of keeping in condition the road-bed, track, tunnels, bridges, telegraph and other properties. It amounted to nearly $3,000,000.00 for 1931.

Tonnage of Goods

The ton-kilometer curve shows the growth and decline of the business since 1915. Ton-kilometer is the tonnage multiplied by the distance travelled and this gives us the common unit to show the business done. In 1923 the ton-kilometer of goods handled was 1,568,662,814 while in 1932 it was less than 900,000,000. The general world economic depression and the local disturbances combined to pull our business down. Then we are handicapped by the shortage of rolling stock. For the first four months of the present year we handled a great deal more tonnage than the corresponding months of 1933 showing that there has been a marked increase in efficiency in the use of the rolling stock available. This credit must be given to our new Traffic Manager, Mr. Chiu, who is one of our most capable men in traffic operation.

We express the passenger business done by the passenger-kilometer. The biggest passenger business done was in 1920 when the figure was at 625,878,764, there being over 4,000,000 passengers carried. All the railways have found that the money comes from the third class passengers so every railway is now paying more attention to the development of the third class business and making improvements for their comfort and convenience. Our express trains are often empty and running at a loss. It is no exaggeration to say that sometimes only one or two passengers are travelling in the first class compartments. Formerly we ran the express trains daily for show but now in view of the shortage of engines we have cut down the express trains to every other day, or four times a week thereby saving several engines for hauling goods.

Rates

The rates of the railway as stated before are now gradually decreasing. This question of rates is a very important one. In China we have not yet arrived at the up-to-date method of fixing the rates at what the goods can bear. Every railway fixes its own rates but subject to the approval of the Ministry of Railways. The Lung Hai Railway, being a new line, has lower rates than our line with the result that large quantities of goods have been diverted eastward at Chengchow. During the past five years the Lung Hai line has taken from this railway approximately 400,000 tons of freight composed mainly of cotton, peanuts, medicine, melon seeds, etc. From Hsuchow, a center of the tobacco growing district, the Lung Hai is trying to get the tobacco leaf business by motor bus across country to their station. However, our management is studying the question earnestly and will take action in reduction when it is convinced that by such reduction the volume of the business can be increased and both the railway and the shippers mutually benefited.

Branch Lines

In order to increase our business we are considering the building of more branch lines to act as feeder lines. Two such feeder lines are now under consideration, one eastward from Yencheng (km. 834) to Chow Kia Kow, a distance of 60 kilometers. This line would tap the rich agricultural district in Honan. In former years when conditions were normal it is said that an endless line of native boats came into Yencheng bringing beans and sesamon seed for the Hankow market. The local merchants of Yencheng and Chow Kia Kow have offered to finance the road-bed construction if the railway will lay the track so this case is only a matter of time until we can find the necessary money to buy the materials. The second branch line which might be profitable is westward from Hsuchow (km. 780) to Yu Hsien 47 km. This branch would collect agricultural products along it and reach a coal mine at Yu Hsien. The management has sent out several men to survey the field and inspect the coal. In case the coal at Yu Hsien is of required quality and quantity this line would be a very much needed one for at present we have no coal mine south of the Yellow River. In building branch lines our plan is to buy new standard rails and use them for the main line and shift the old rails for use on the branch lines. In this way we can build branch lines at a minimum of cost. As soon as conditions permit these two branch lines will surely receive our attention.

At present we have four short branch lines all under 20 kilometers and north of the Yellow River bringing in coal. There are two branch lines built especially for supplying stone, and one branch line 42.5 kilometers long to the Siling Tombs for the former annual worship by the Manchu Imperial family. There is also a branch line 20 kilometers long running along the north bank of the Yellow River up stream from our bridge. This was built to carry stone for the protection of the north bank which is subject to violent action of the current due to a bend in the river throwing the current at an angle to the north bank. Besides the above branch lines we have the connecting or junction line with the Peiping-Mukden line but the greater part of this junction line belongs to the Pei-Ning Railway and we have to pay the Pei-Ning an annual rental for its use.

Principal Products

The principal products carried by this railway are as follows :—

1st class :	Silk piece goods, matches (imported), furs used for clothing, wines and spirits.
2nd class :	Cigarettes, piece goods, kerosene, livestock.
3rd class :	Refined sugar, imported tobacco and salt, oils, eggs.
4th class :	Bamboo, lumber, crockery, pigs, sesame seed, cotton, peanuts, flour, fruit, and tobacco leaf.
5th class :	Beans, grain, vegetables, salt.
6th class :	Coal, stone, lime, and bones.

South bound from Yencheng we have food, grain, cotton, and tobacco leaf.

South bound from the Liu Ho Kow branch line is coal. Only a small percentage of the coal from this mine goes northward.

From Shih Chia Chwang we have coal going northward and salt going south.

The above are the important centers in which the freight originates. In general the important items are : beans, sesame seed, coal, salt, cotton, and tobacco leaf. These items constitute our main goods traffic so whenever the market is against these products the railway is directly affected. Just now with the market against beans and sesame seed our revenue is considerably affected. In view of the great percentage of empty wagons going northward the administration is studying the various commodities with a view of inducing the merchants to ship goods northward by giving a reduction in the rates. As an example we are trying to induce merchants to ship Hunan rice to the Peiping market and the railway is offering a very substantial reduction in rates so that Hunan rice can easily under-sell imported rice at Peiping. Special reductions in rates for other goods are also being made.

Rolling Stock

In 1923 this railway had 229 locomotives, 360 passenger carriages, and 3,919 wagons of various capacities, all more or less in running condition. A recent inventory shows that now we have only 205 locomotives, 300 carriages and 2,705 wagons. Of the rolling stock in hand we have only 139 locomotives and 1,844 wagons in running condition. The remaining locomotives and wagons are either under repairs or waiting for repairs. Due to the difficult labor conditions and the great lack of materials the repairing of the rolling stock is very slow. To show with what handicaps we are faced in handling the traffic I just cite the Shantung Railway locomotive condition for comparison. On that railway they always have over 100 locomotives in running condition and only handle about one-third of our business over a line one-third as long as ours. If our rolling stock were in a better condition certainly we could easily increase our income. Also our locomotives are of very old types with an average age over 15 years and many over 20 years. It is very difficult to repair them and they are really very inefficient. In most countries many of our engines would have been scrapped. Our wagons are of

(Continued on page 119)

Road Construction in Kwangsi*

By WONG WING WAH, E.M.

COMMUNICATION is one of the main factors in developing a province. Unless we can reach the remote corners of the Province with the least possible delay of time, we can not hope to make it peaceful and up-to-date. Because of financial drawbacks, we did not attempt to build railroads, but have concentrated our efforts, and money, in trying to connect all parts of the Province by motor roads.

There are now 7,278 *lis* or about 3,594 km. of roads opened to traffic, and over 2,000 *lis* under construction. Much credit is due to the farmers, who were willing to work for the meagre sum of from fifteen to twenty-five cents local currency a day (just enough for food), thus reducing the cost of construction to about seven or eight thousand dollars local money per *li* which would otherwise have cost about fourteen hundred dollars per *li*.

Most of the roads are only dirt covered ones, with no rock foundations of any kind whatever, but these are being replaced by macadamized ones gradually. The bridges are mostly wooden, with a few made of stone and concrete. Ferries are used in most places instead of bridges, on account of the extreme rise and fall of the water level every day due to the tides.

The main scheme is to connect Kwangsi with its neighbors via the main cities of the Province, and also to shorten the existing routes if possible. It has been so well arranged that when the Hunan side finishes its 270 *lis* to meet us, we shall be able to travel from Hanoi, through Kwangsi to Hankow.

To facilitate the work, the whole Province has been divided into five districts, namely Nanning, Liuchow, Kweilin, Tsang Ng and Jun Nan, each having a sub-office under the direction of the main office stationed at Nanning.

The following table shows the progress made in each district to date :—

Name of District	*Lis completed*	*Lis under construction*	*No. of bridges*	*No. of culverts*	*Ferries*
Nanning	1,880	634	102	958	5
Jun Nan	743	482	127	552	1
Liuchow	1,678	1,167	353	1,549	9
Kweilin	1,530	853	297	1,735	13
Tsang Ng	1,456	458	207	893	3
Total	7,287	3,594	1,086	5,687	31

Before the road was built from Ho Chee through Nam Dan to Lok Jie to meet the Kweichow roads, the distance between these towns was 260 *lis* by a narrow path through mountainous gaps, and curves, with weeds and grasses growing almost man-high. If one undertook the journey on foot or horseback, and started out before sunrise, not stopping until after sun-down, it would require about four days to make the trip. Now that the road is opened, it only takes several hours by the 193 *li* motor road. Midway, near a place called Mong-Chung the road is about 2,233 feet above Ho-Chee City, but the bends, bridges, and curves are so well-graded, that it is not difficult for the cars to climb the various grades.

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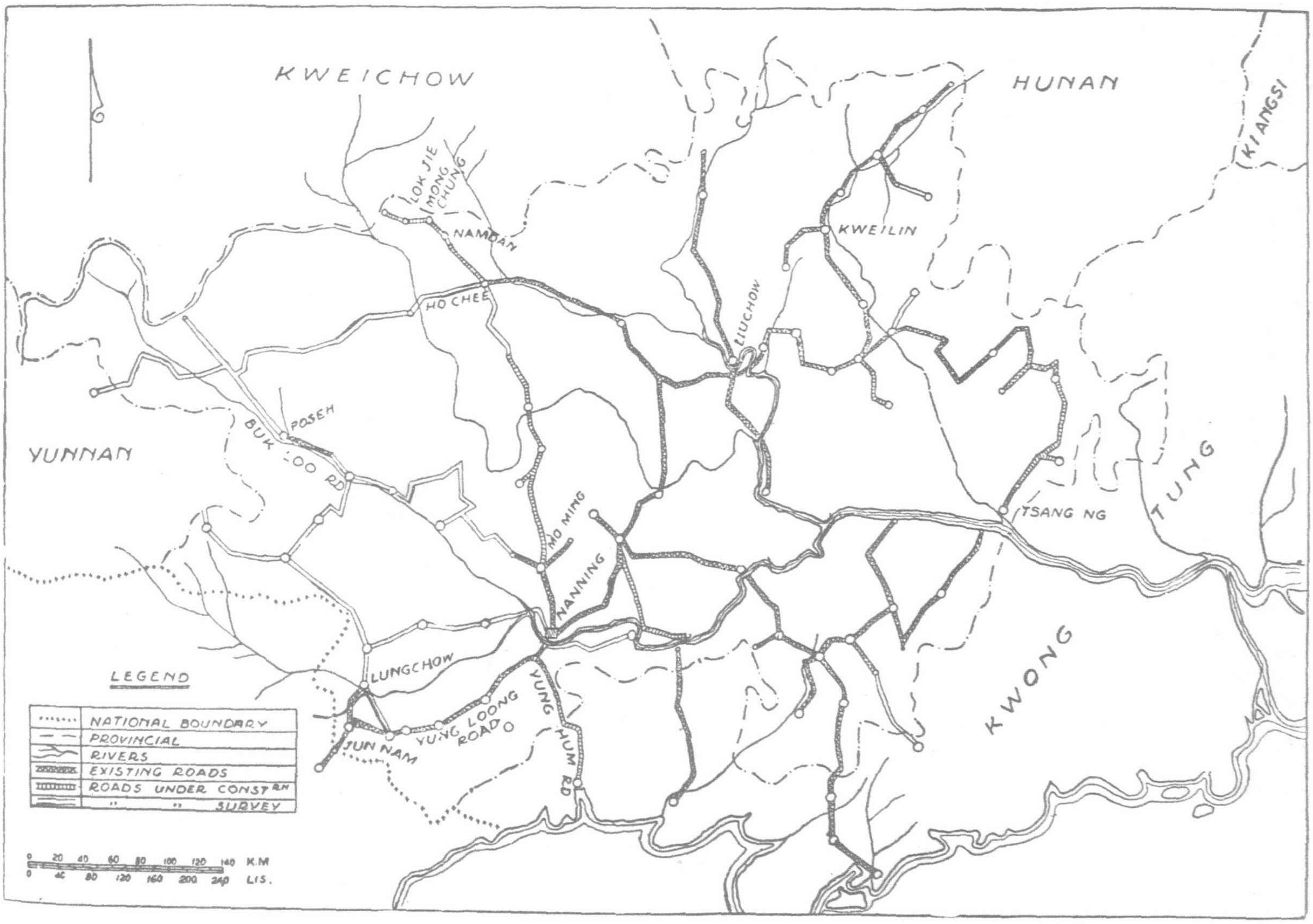
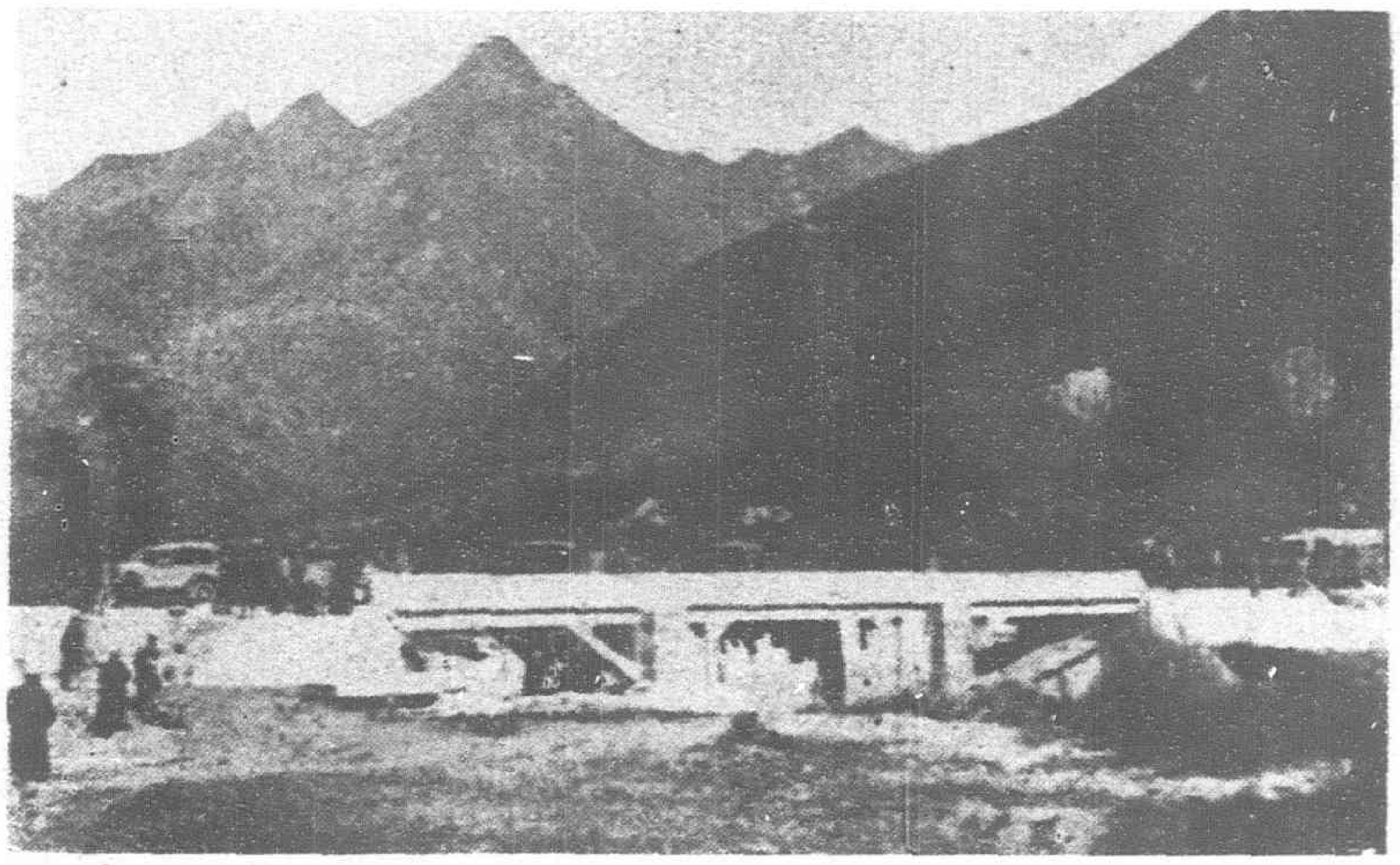
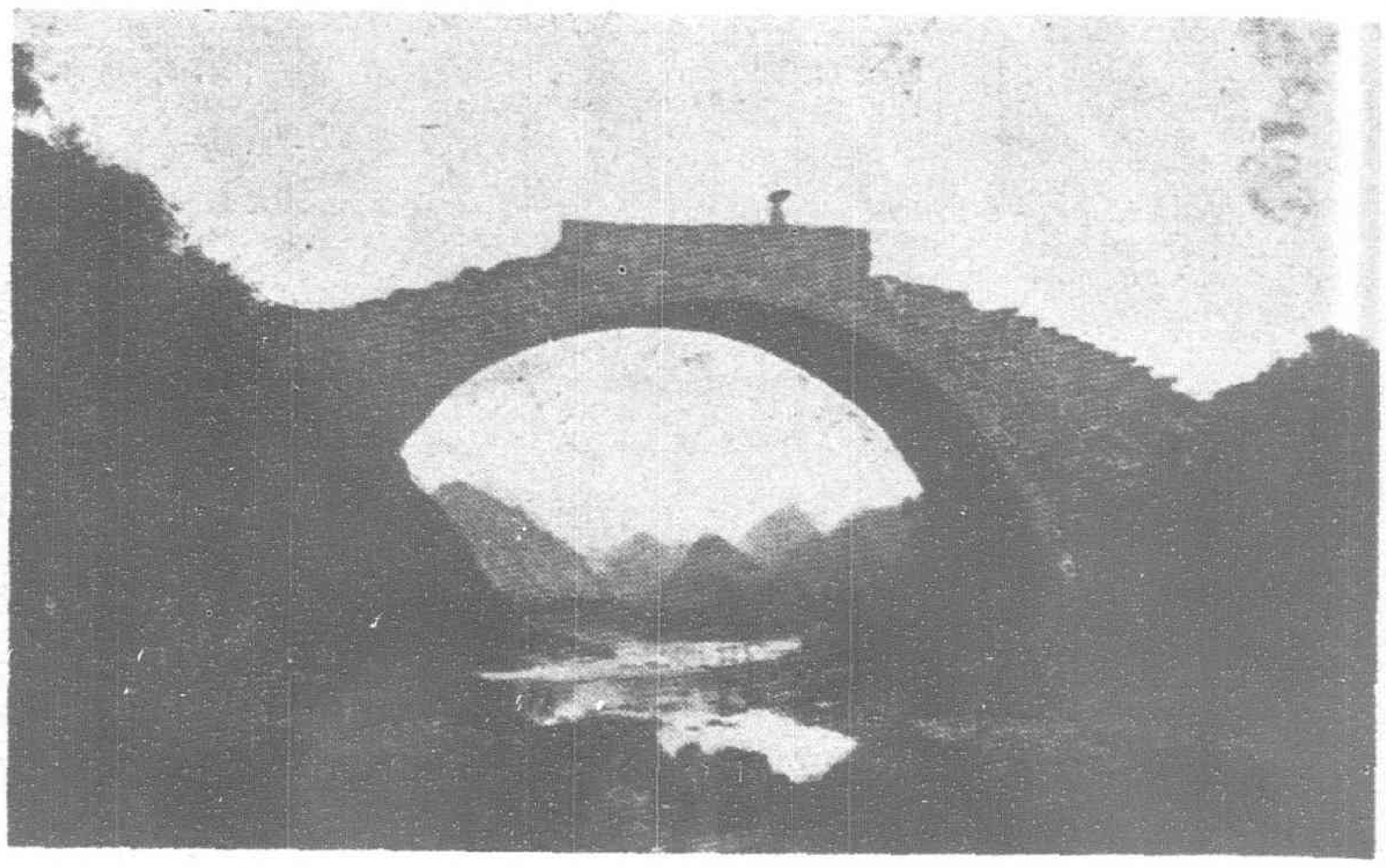
*Hongkong University Engineering Journal



Map of Kwangsi Province Showing Existing and Proposed Roads



Bridge on the Dan-chee Road



Another Bridge on the Dan-chee Road

A 72-ft. Bridge on the Dan-chee Road

On account of financial difficulties, most of the bridges and culverts on the other roads were constructed for temporary use only, but realizing the shortcomings of this mode of construction, the bridges on the Ho-Chee Lok Jie road were made to last permanently. The road is about 16-20 feet wide in the narrow passes and 24 feet on the plateau, and averages about 20 feet all the way. Trees have been planted along both sides of the road thereby giving it a touch of the picturesque and the scenery all along is beautiful.

There are several other important roads that must be opened to traffic, but again, on account of financial drawbacks, the work is not being carried on as quickly as we should like it. When the Yung Hum Road, with a total length of about 155 *lis*, about half which has already been completed, is opened to traffic, it will lead us to the Kwangtung border, and thence to the sea. The Buk Loo Road will eventually lead us to Yunnan, thus enabling this province to send her goods through Kwangsi to Nanning via Poseh, Ping Ma and Mo-Ming. Its length will be about 103 *lis*. The Mo Ping Road from Mo-Ming to Ping Ma, connects with the Buk Loo Road, and of the total length of about 440 *lis*, 350 are now under construction. The Yung Loong Road leading from Nanning to Lungchow into French Indo-China has been opened to traffic for some time already.

All the expenses for the above roads have been provided for in the Provincial Budget. Then there are in addition roads being constructed and paid for out of the District budget and from money from local district funds. These latter roads are under the supervision of engineers sent out by the Highway Bureau and are not included under the seven thousand *lis*.

As the work of completing and opening up new roads to traffic is going on, we must concentrate some of our efforts on the repairs to the ones already in use, in order to keep them in good condition. Some of them must be widened at places and have more pebbles added, grades cut down and culverts and bridges remade. The life of the temporary culverts is about three years, but when new ones are put in they will last permanently. During the rainy months, the wooden bridges are sometimes washed away, and these are being replaced with stone or concrete ones.

Finally, it will not be out of place to mention that we are trying our best to make our dollars go twice as far, which is necessary here in Kwangsi, where the local dollar undergoes violent fluctuations and is at a discount making it difficult to meet the bills for materials and machinery imported from abroad. With the eager help of the people, under the able supervision of our engineers, we must connect up each and every remote corner of the Province, so that the people will not have reason to think they are living in the place that "God forgot."

Statistics of the Roads under Construction

Name of road	*Lis*	*No. of bridges*	*No. of culverts*	*Approx. cost*
Dan-Chee (just completed)	193	62	531	$1,200,000
Yung Hum	155	—	—	—
Buk Loo	103	59	360	100,000
Mo Ping	440	25	400	550,000

British Control Gear for the "Scharnhorst"

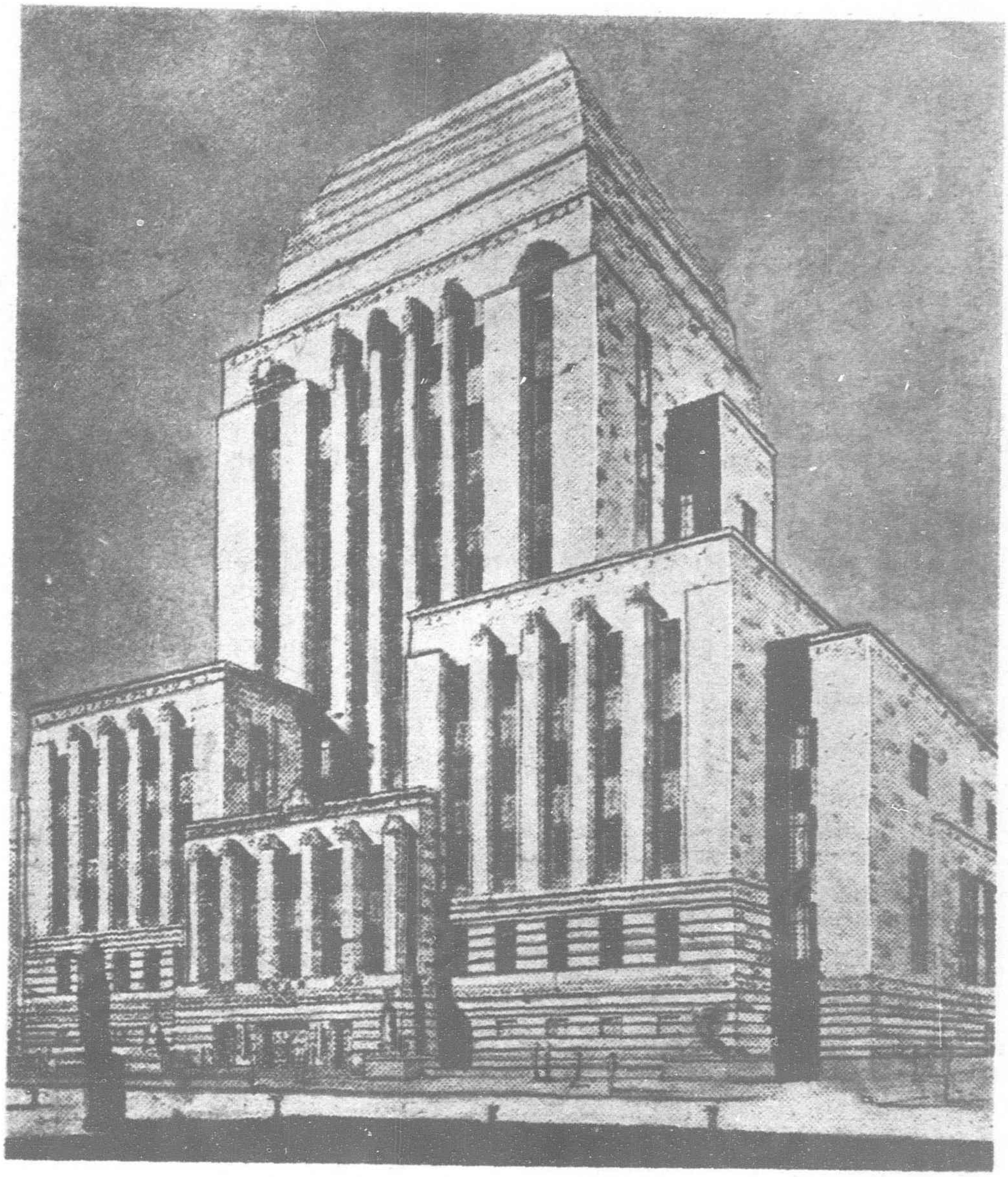
The fact that the recently launched North German Lloyd liner *Scharnhorst*, which is soon to inaugurate an express service from German ports to Shanghai, will be equipped with Control Gear for its turbo-electric propulsion equipment made at Rugby by the British Thomson-Houston Co., Ltd., is a marked tribute to British engineering practice. The control arrangement is in effect an electric servo-motor system which automatically safeguards the handling of the liner's huge propulsion motors and the generators under all conditions.

We are informed by the B.T.H. China agents, Messrs. Inniss & Riddle (China) Ltd., that following on the continued successful operation of the B.T.H. Diesel Electric ferry boat *Electric Star* running between Hongkong and Kowloon, their principals have received an order for Diesel Electric Propulsion equipment for a larger double ended Ferry, for the Port Jackson and Manly Steamship Co. operating in Sydney Harbor.

This Ferry will have electrical propulsion equipment generally similar to the *Electric Star* comprising Propulsion Motors in series with the main D.C. Generator together with the B.T.H. patent scheme of control known as the "Controlled Current" system which electrically protects the propulsion equipment in all conceivable circumstances. An outstanding feature of this system is the complete avoidance of relays and contactors; also the propeller speed and the direction of the ferry are both directly controlled from the Wheelhouse. Thus instantaneous response without any time-lag whatever is obtained and the reversal of the driving motors from "Full Ahead" to "Full Astern" is carried out without any risk of dangerous current surges. The risk of the human element is practically eliminated by this system.

Important B.T.H. Contracts secured this year (1935) to date include a 75,000 kw. turbo-alternator for the County of London Barking Station, this being the third set ordered from B.T.H. for this station, a 50,000 kw. set for the Kearsley station of the Lancashire Electric Power Co., the alternator being wound for 33,000-volts and a 30,000 kw. turbo-alternator for the Spondon Station of the Derby and Notts Electric Power Co. All these equipments will be manufactured at Rugby.

Hongkong and Shanghai Bank Erecting Magnificent Structure in Hongkong*



Des Voeux Road, or Statue Square, frontage of New Headquarters of the Hongkong and Shanghai Banking Corporation in Hongkong

THE foundation-stone of the new headquarters of the Hongkong and Shanghai Banking Corporation was laid at Hongkong in October, the event, an important one in the history of the Colony, being marked by fitting ceremonial. In the presence of a large gathering, representative of the leading interests in Hongkong, H.E. the Governor, Sir William Peel, laid the foundation of what will be not only the most modern banking premises in the Far East, but a most imposing landmark, attracting the shipping of all nations to one of the greatest ports in the British Empire.

The great building, of which an architect's sketch is reproduced herewith, has been designed by Mr. G. L. Wilson, of Messrs. Palmer and Turner, Shanghai, who was also responsible for the design of the Bank's magnificent premises facing the Bund in Shanghai. The organization and direction of the construction program is in the capable hands of Messrs. M. H. Logan and L. W. Amps, Chartered Civil Engineers, who have taken out from England a staff of expert supervisors. The *Hongkong Weekly Press* gives some interesting details of the new building, from which we take the following extracts :—

The building covers the site of the old bank, and, in addition, that of the Theatre Royal and Wardley Street, and extends the full width of Statue Square, the main axis of the new building being centered on the Queen Victoria Memorial in the center of the square. The building has been designed to provide a fitting background to the square. The frontage to Des Voeux Road is 247-ft. 6-in. and that to Queen's Road approximately the same, the actual building being 220-ft. square, leaving a private roadway on the west side. The height to the top of the tower will be 220-ft. The building has been designed on dignified lines with little ornamentation, the solid base without windows on Des Voeux Road suggesting the impregnable strong rooms behind. Massive piers, the full height of the tower, will be terminated with carved figures representing Men of Vision. Four massive lions' heads representing Strength complete the sculpture on the tower. Bronze panels, five in number, in the windows over Des Voeux Road, will represent China, Japan, India and the Federated Malay States, the countries in the Far East in which the Banking Corporation interests chiefly lie. The center panel will bear the coat of arms of the bank.

The level of Queen's Road is several feet above that of Des Voeux Road : there is therefore a ground floor and a lower ground floor, and below that a basement to accommodate the boilers, pumps, ventilating machinery, workshops, etc. The main banking hall will be at the Queen's Road level, and the treasuries, safe deposit, etc., at the Des Voeux Road level. The administrative offices will face Statue Square. The main banking hall will be about 210-ft. by 95-ft., with a mezzanine at the ends. The height of the banking hall will be 27-ft. over the working space, with a barrel vaulted ceiling 47-ft. above.

The first to the seventh floors inclusive have been designed as offices for letting. At the top of the tower will be a rest room and luncheon room for the staff with a gallery around the upper part of the tower, flats for senior married employees, a flat for the chief manager, a squash court, etc.

The banking portion of the premises will be the last word in bank design. The whole building will be ventilated by a "conditioned air installation," providing ideal temperature and humidity all the year round, irrespective of external conditions. Electric fans are not required.

The main entrance to the bank is from Queen's Road. The bronze gates are designed with a grille, suggesting a portcullis ; three knights in armor stand guard, and the design symbolizes protection and safety. The entrance hall is an irregular octagon in shape, about 460-sq. ft. and rises to a height of 27-ft. It is of granite throughout. The lighting will be by projectors hidden in granite pedestals. In the wall opposite the main entrance gates approached by five steps is a bronze screen and doors ; incorporated is the bank's coat of arms. The granite walls, stone ceiling and heavy gates give an impression of immense strength.

The main banking hall is of great size, being 210-ft. long and 95-ft. wide, with model counters on each side, the ceiling, barrel vaulted, and 47-ft. above the floor, will be covered with glass mosaics. The design consists of two main groups of figures in color symbolical of Banking and Commerce, the former supported by Agriculture and Mining, the sources of all wealth, the latter supported by Industry and Shipping. At the top of the vault in the center will be an allegorical group composed of Ceres the Goddess of Abundance with her Cornucopia and Helios the God of the Sun driving his chariot across the sky and shedding light on the groups of figures below.

The walls and columns in the banking hall will be finished with marble, much of it coming from Devonshire, a beautiful rich dark marble called Ashburton. The filling slabs to the walls and certain piers will be a light colored marble called Botticino. The floor of the public space will be paved with Travertine with bands of Swedish green. The general lighting of this hall will be by

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**Eastern Engineering and Commerce*

concealed lights designed by London experts to provide no shadow over the working space. In addition, specially designed desk lamps have been designed for occasional use.

The administrative offices overlook Statue Square. They consist of the Chief Manager's private room, Manager's room, Secretary's room, Waiting room, Telegrams, Books, Chief Accountant's Department, with special Securities room, Interview rooms and Brokers' room, etc. The Brokers' room is provided with twelve telephone boxes. The walls and floors of the principal rooms will be finished in light colored marble. Recesses for safes, codes, books, etc., will be provided.

The second entrance to the bank from Des Voeux Road is below the executive offices, the main floor being reached by a wide marble staircase and two fast automatic lifts for brokers. A bronze screen with double doors will give access to the safe deposit and the staff lifts and staircase; on the right, through a similar screen, is the office entrance hall and lifts.

The safe deposit will be one of the strongest in the Far East. The main door will weigh 17 tons and so beautifully balanced that it can be moved with one finger. In addition there will be an emergency door of equal strength. The 6,000 boxes and small strong rooms and the ceiling will be of stainless steel. The lighting will be on the indirect method and this wonderful deposit will also be air conditioned. Small rooms fitted with steel desks, telephones and other conveniences will be available for customers who wish to deal with their valuables without removing them from within the protective grille.

There will be eleven lifts in the building. Passenger lifts will run at a speed of 500-ft. per minute and will be automatically controlled.

The mezzanine overlooking Statue Square will provide accommodation for the Board room, Sub-Managers' room, Filing rooms, Telephone Exchange, retiring and rest rooms for women employees. The Board room will be about 800 sq. ft., the walls lined with a specially selected sandstone, the veining of which resembles walnut panelling. The mezzanine at the south end will accommodate the stationery room, filing rooms, lavatories, rest and changing rooms for the Portuguese and Chinese members of the staff.

The building will be of fireproof construction throughout. The only wood will be the parquet floors in the residential quarters.

The steel frame is of chromodore steel, this being the first building in the world where this steel has been used throughout.

The materials for the building are being obtained almost entirely from the British Empire.

The roofs are being specially insulated against the heat of the sun, and the whole building will be "air conditioned." The plant has been designed and is being installed by experts from London. The invisible panel heating system will heat the building in winter.

Amongst other features may be mentioned grids in all office floors to enable telephones to be installed in any position without running loose wire about the walls, floors and ceilings; oil-fired boilers; automatic telephone exchange; emergency lights to treasuries, central counter, corridors and staircases in case of a breakdown of the electric company's plant, etc.

Tin-mining in Kwangsi, China

THE authorities in Kwangsi province are making elaborate preparations for the development of tin mines at Fuchuan, Chungshan and Hohsien, where the total mining area is estimated to cover hundreds of square *li* and the mines are believed to be capable of producing nearly 20,000 tons of tin valued at some $60,000,000 a year for a period of over 70 years. Although Yunnan is a well-known tin-producing province, yet its output is not sufficient for home consumption and the balance is imported chiefly from Singapore. As the current market price of tin is rather high, Kwangsi authorities believe that it will be very profitable to work these mines. As a preliminary step a Mining Bureau was organized last year and after careful prospecting during the past twelve months, the Bureau's experts have obtained very satisfactory results regarding the contents of these mines.

According to a report issued by the Bureau, from Tawantang and Paimiaoshan to Miaowan the mining field may be divided into several sections. The section from Tawantang to Piaotou covers about 90 square *li* and lies on a plain. At Paimiaoshan and the adjacent hills the mines are found partly on the tops and slopes of hills. At this place the total mining area is estimated to cover 60 square *li*. From Piaotou to Wankao the mining field covers about 100 square *li*, lying partly on a plain and partly on the slopes of hills. The mines at Wankao are reported to be particularly rich in tin ores. From Wankao to Piaotou the mining area covers about 250 square *li* and from Wankao to Miaowan, 150 square *li*.

After careful prospecting the Bureau has obtained very encouraging results. From the 76 shafts sunk at Wukungshui and its neighborhood for the purpose of testing the earth obtained is found to contain on the average 0.9 ounces of tin ore, though much richer finds have been obtained from mines at other places. It is estimated that in these regions the yearly output of tin will be in the neighborhood of 19,500 tons, worth about $60,000,000 and that mining operations may go on at this rate for a period of at least 70 years.

The rich tin mines of these districts have long been known to the public and at many places the mines have been worked by old methods. Individual miners or small mining concerns with limited capital, however, cannot proceed with the operations when the shafts have reached a certain depth, as the miners have no up-to-date machines to pump out flood waters. The recent advance in the price of tin has attracted many capitalists to that part of the province to try their luck. As these mines cannot be made to yield ores to the fullest extent without the employment of modern machinery, seven or eight large companies have been started to work with better equipment. Of these, four are already in operation and the rest are in process of organization. Miners using old methods generally work individually and their number is estimated at over 10,000 but the total yearly output is very limited, averaging 1,500,000 catties (15,000 piculs or less than 900 tons), which is only a fraction of the quantity the authorities expect to produce by means of modern machinery. The only deterrent to the development of these mines is the absence of transportation facilities. These three districts are tucked away in the mountains of North-eastern Kwangsi, where travel or transportation by overland routes is exceedingly difficult, while the water borne traffic by the Ho Kiang, a tributary to the West River, is suspended during autumn and winter, the low water season.

To work the mines the Kwangsi authorities have decided to establish in the near future a power plant capable of producing 2,500 kilowatts. The cost including wiring, poles and building is estimated at $1,000,000, Hongkong currency, which will yield ample returns. After the full development of the mines the authorities expect that in addition to profits at least $2,000,000 a year will be brought into the provincial treasury in the form of royalties and taxes.

The importance of tin to the modern food-canning industry cannot be over emphasized. According to a recent *bulletin* issued by the International Tin Research and Development Council, the 27 per cent increase in the world's consumption of tin, which occurred during the year ending last May, is largely due to the demand from canners of fruit and other foods in the United States. In China tin was much used in making tin foils for the production of "joss" money. Shaoshing, Chekiang province, is the largest center of this industry and every year large shipments of tin from Singapore are consumed in the Shaoshing tin foil factories. In recent years the tin foil making industry is on the decline, as the people have become more enlightened and superstitious beliefs are generally discredited. China's consumption of tin has, however, shown an increase instead of a decrease, notwithstanding the decline of the tin foil making industry, as tin had found a new use in the food canning industry, which is growing very rapidly in many provinces. There are fruit, meat and other food canning factories which consume millions of cans a year. A can-making factory is operating in Shanghai turning out cans from imported tin. The development of the tin mines in Kwangsi will not only bring wealth to the province but also encourage the food-canning industry in the country as the cost of producing canned food will be reduced by cheaper cans.—*Chinese Economic Bulletin.*

The Road to Lanchow from Sian*

By O. J. TODD, *Chief Engineer, China International Famine Relief Commission*

With the spread of the movement for better roads in China attention is now being directed toward the North-west. This sparsely settled, poor country has been the victim of neglect partly because of its isolated location with regard to the center of trade, or to the main railways. It received its first sympathetic attention in recent years as a result of a very dry cycle that produced widespread famine in 1929 and 1930.

In both Kansu and Shensi work relief projects were used as a means of distributing food in 1930. The improvement of the highway system was the method then given the strongest support. As a result the Famine Commission improved 400 miles of roads in Kansu and 150 miles in Shensi. It also built 100 miles of new road for motor-car traffic in Shensi.

This road improvement program of 1930, financed by a philanthropic organization, started a movement that has grown. Though much that was accomplished in 1930, in the Sian and Lanchow districts and neighboring territory, was merely a bi-product of work relief for starving farmers, yet the result was most beneficial. It produced a greater appreciation of graded roads.

As the famine situation continued to be acute this program was extended in 1931 when the improvement of the main road from Sian to Lanchow was undertaken by the same agency (C.I.F.R.C.) at the invitation of the provincial governments of Shensi and Kansu. A new gift from America of $350,000.00 was dedicated to this work with the hope that a carefully laid out motor road with moderate grades would be the final result. This fund was to go toward the reduction of the worst hills, realignment where necessary, bridge and culvert building, etc., following in so far as practicable the old route.

This work went forward from June, 1931 until August, 1932, when disorders and murders made the closing of the work advisable. Bandits, petty robbers, and mutinying soldiers were no respectors of persons when they were in need of money and food. Men of all nationalities suffered.

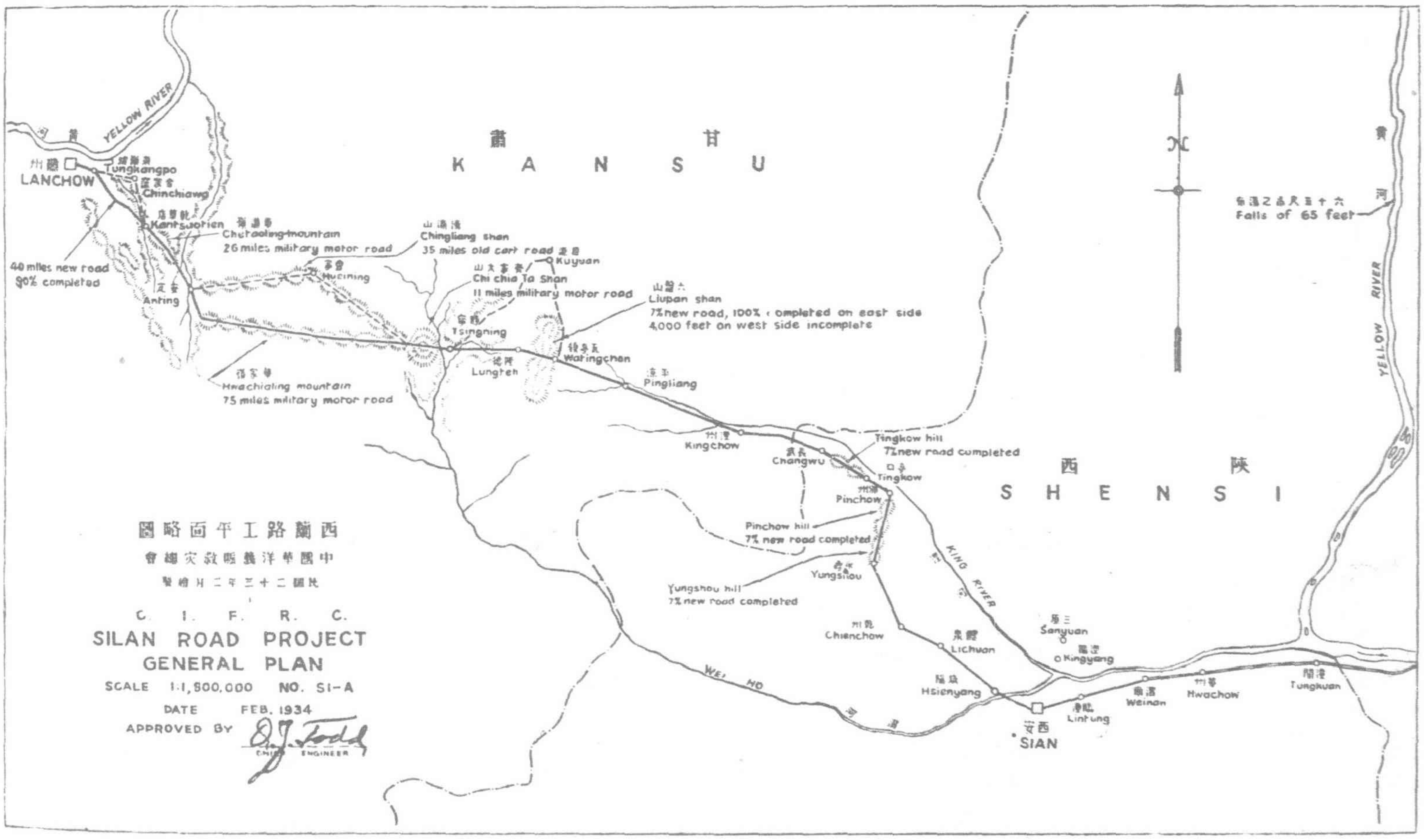
Realizing the great need for this road both for transport of goods and passengers and also as an aid in policing the region, the National Government then appropriated an additional sum of $200,000.00 to carry this work along. This, with the remainder from the fund of 1931-32, financed the work of 1933. It has therefore been possible to complete most of the regrading of this road over the seven worst hills along this route. This includes a long detour at the Lanchow end where many miles of new road were constructed. It also includes a well graded road over the famous Liupan Pass, as well as many other hard stretches of new cuttings at various points as described in the following paragraphs.

Throughout this work there have been hazards for the construction staff not because of slipping ground, floods, or falling rocks in tunnels, but due to armed outlaws that have been preying on the countryside for years, due to poverty, isolation, and lack of governmental control. This road work has been carried on in the midst of bandit-infested territory which has rendered it all the more difficult and for the same reason all the more important.

Description of the Country

The highway from Sian to Lanchow commences at an altitude of 1,500 feet above sea level and gradually rises 2,400 feet in a distance of 70 miles, where the first steep hill is found at Yungshou. After passing over this hill into a valley close to the King River the road climbs another long hill before it descends to the city of Pinchow. Following the King River valley, 12 miles west of Pinchow the highway crosses Tingkow Creek where a substantial paved ford is being built to replace an old stone bridge that has long since fallen into ruin.

Then the difficult Tingkow hill is encountered. A year ago grades of 30 per cent existed here. The new road up that hill has a maximum grade of seven per cent.



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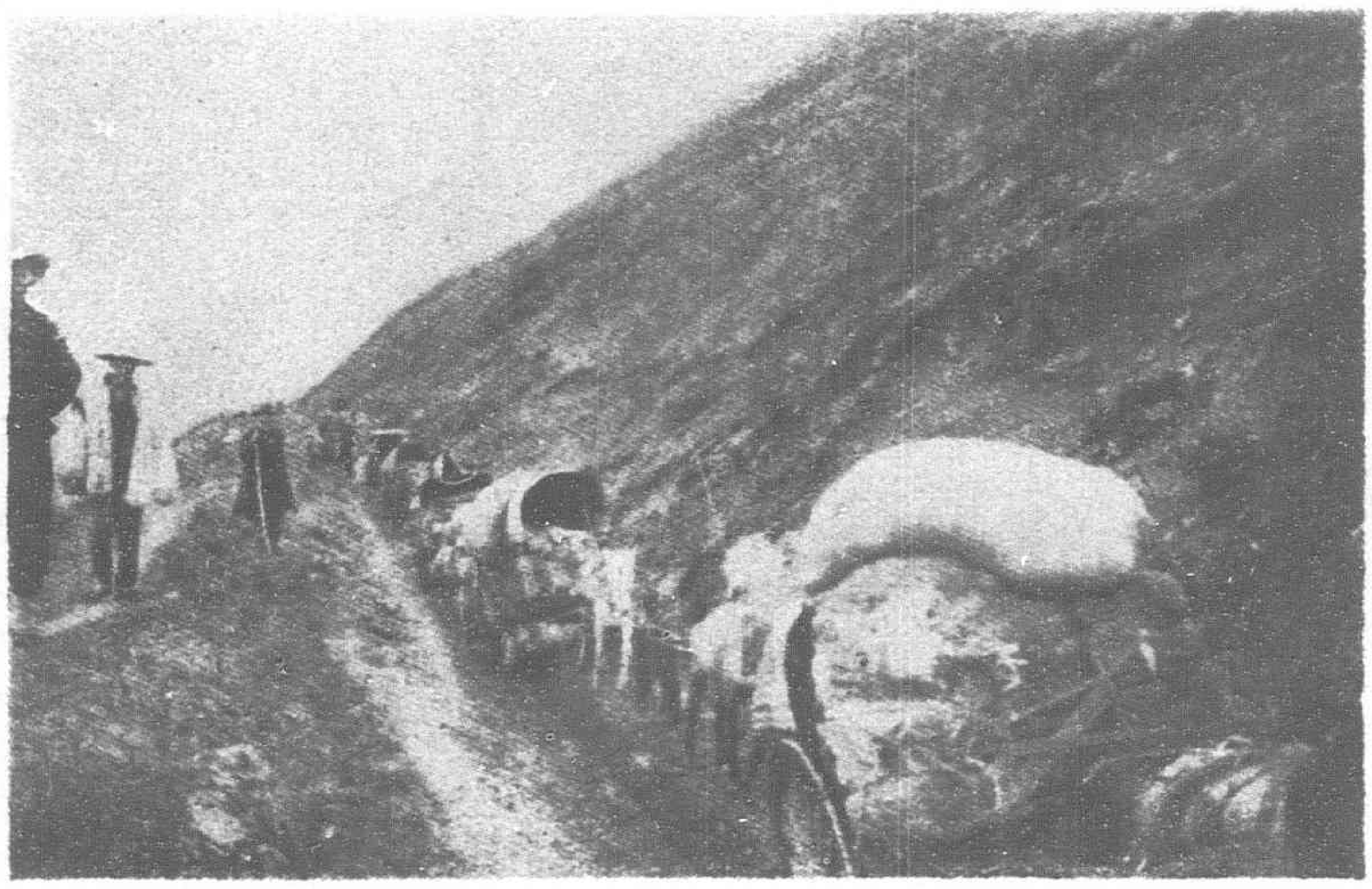
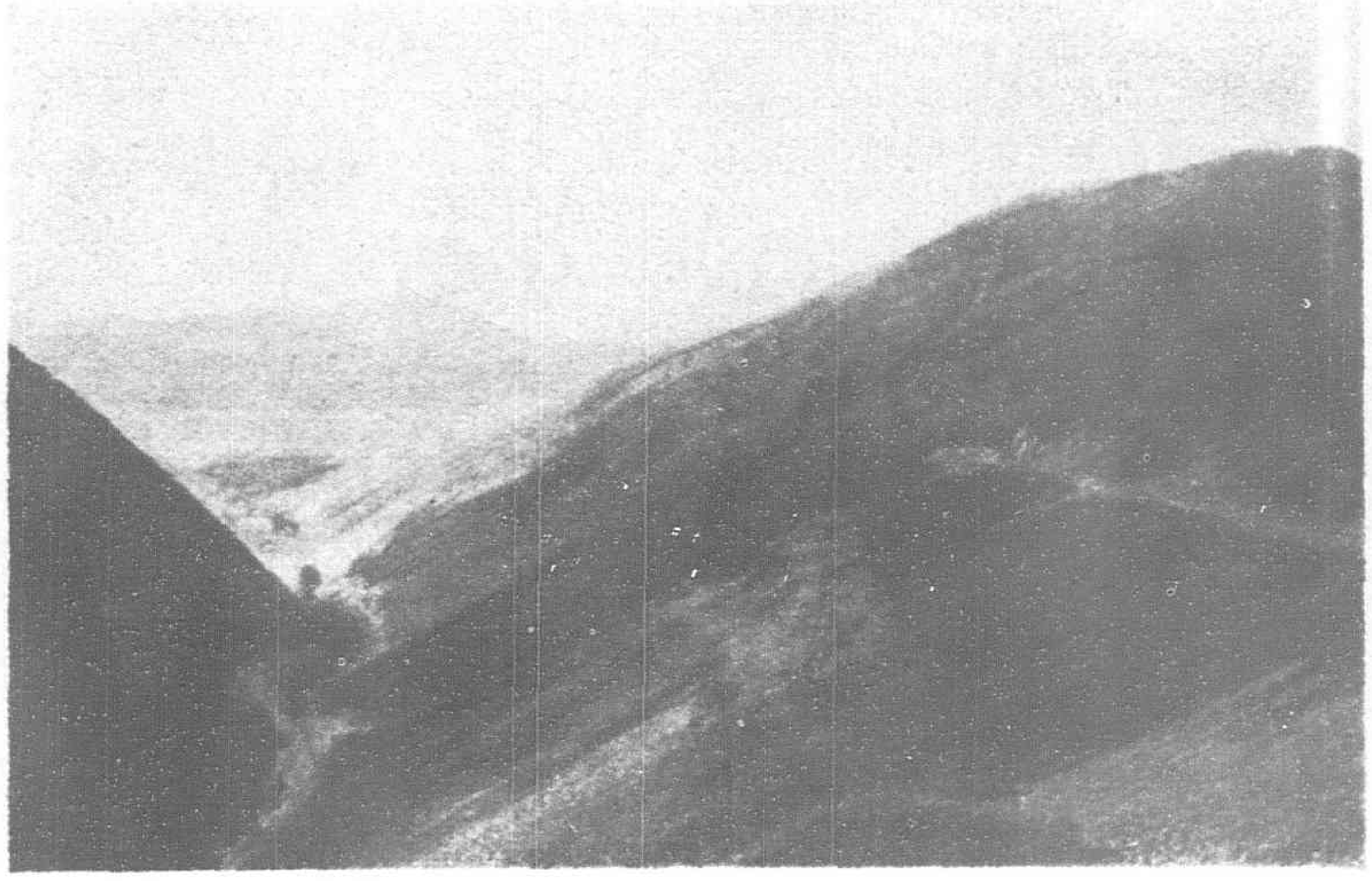
* *Journal of the Association of Chinese and American Engineers.*



The Old Cart Road near top of Liupan Pass on west slope



Looking west from Liupan Pass showing new road grade

High plateau country is then traversed as far as Changwu and into Kansu when a descent is made into the King River valley at Lohantung. From this point on past Kingchow to Pingliang the road follows a gently sloping valley most of the way.

Thirty miles west of Pingliang is the famous Liupan Shan. A road built for motor-cars several years ago extends 30 miles toward the north to Kuyuan to avoid passing over the mountain. Liupan Pass is approximately 9,000 feet above sea level. The new road is built over this pass.

To the west of Liupan Shan the route goes through Lungteh and Tsingning where the Kuyuan loop joins it. Then, 15 miles farther west, the road loops up to a ridge which it follows for 70 miles and then drops to the Anting plain. It is 75 miles from Anting to Lanchow. One bad hill lies a few miles west of Anting but the road is fairly well graded. Half way from Anting to Lanchow, however, many irrigation ditches are found on the old road so that a new detour of 40 miles has been made to reach the Lanchow plain and Kansu's capital.

It is noted from this description that the route is by no means an easy one. Seven or eight of the hills may be classed as major ones. Liupan Shan is the most difficult of these both on account of its height and the rock out-crop making construction costs very high.

Much of the soil on these hills is wind-deposited loess that drains well. But there are also several stretches of red clay which is very hard when dry, but when wet is very sticky. Also there are clay stretches in the King River valley near Kingchow that make wet-weather travel difficult. Aside from Liupan Shan there is little rock encountered on the road.

Some Construction Details

The largest bridge to be built is at Kingchow. But this is not of great importance. Many small bridges and culverts are required but no large ones are needed. The stone paved ford at Tingkow Creek replaces a bridge over the largest stream crossed.

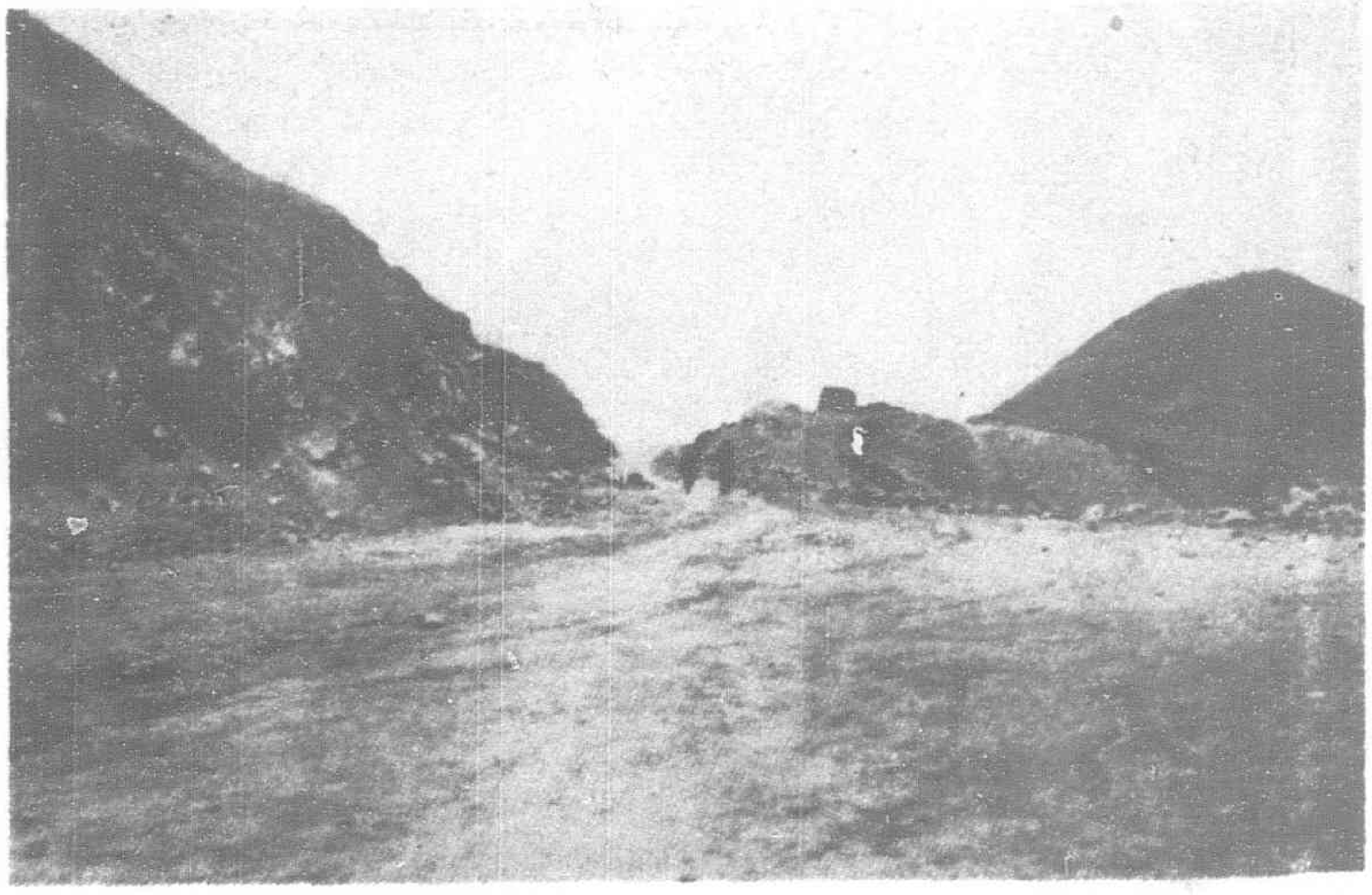
The building of this motor road has been carried on in stages. Seven or eight years ago Marshal Feng's army so improved the old cart road that autos could pass over this road to Lanchow. But the road was by no means carefully built, many steep pitches remained, and the worst hills were but slightly improved. Therefore the program undertaken by the Famine Commission was to retain such stretches of improved road as were usable and follow the same general route that has been used for many centuries between Sian and Lanchow. The most important change in the line was at the Lanchow end where a forty mile detour has been built. Also a detour to the north of Liupan Shan via Kuyuan was eliminated by a rather costly job of building over the pass on seven per cent grades.

This program has thus far cost something over $550,000.00 starting in the early summer of 1931 and running to the close of 1933. Most of the hill reduction has been completed, the forty mile detour near Lanchow is nearly completed and many culverts and small bridges have been built. With another $100,000.00 all grading work can be completed so that cars can make the 480 miles of the trip in three days in good weather. The reduction of all main hills to seven per cent grades or less has been over 90 per cent completed.

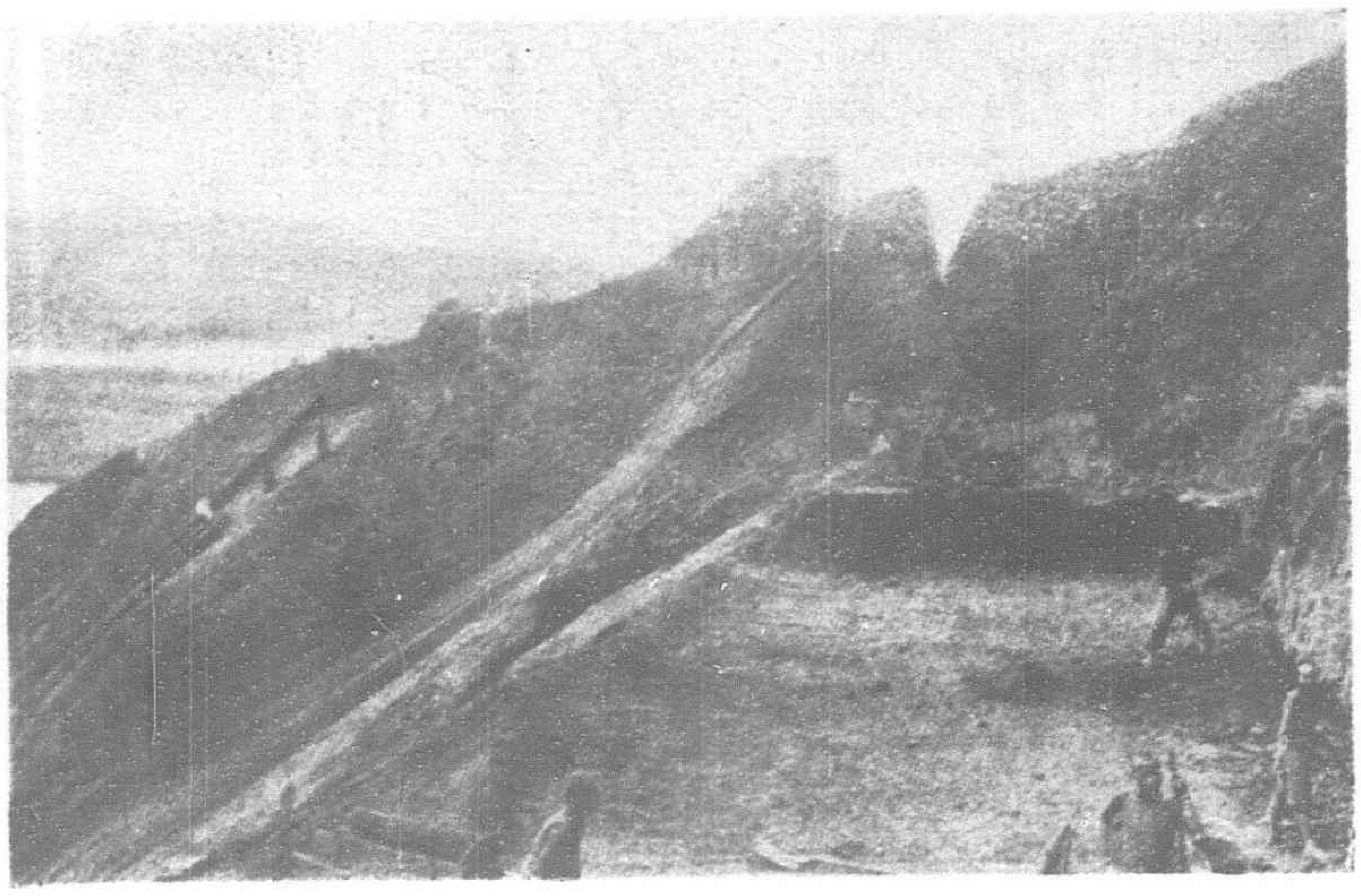
The usual width of this new road is 30 feet though on the slopes of Liupan Shan where rock work is heavy a standard width of 24 feet has been adopted. Crowning and ditching have been given due attention. Culverts are of box type from native timber to accommodate small irrigation ditches. Wooden bridges on pile or post abutments are the rule.

While in dry weather an earth road is quite satisfactory for this country it was found in the summer of 1933, when rainfall was very heavy, that certain clay stretches, such as near Yungshou, became practically impassable for autos even when graded to seven

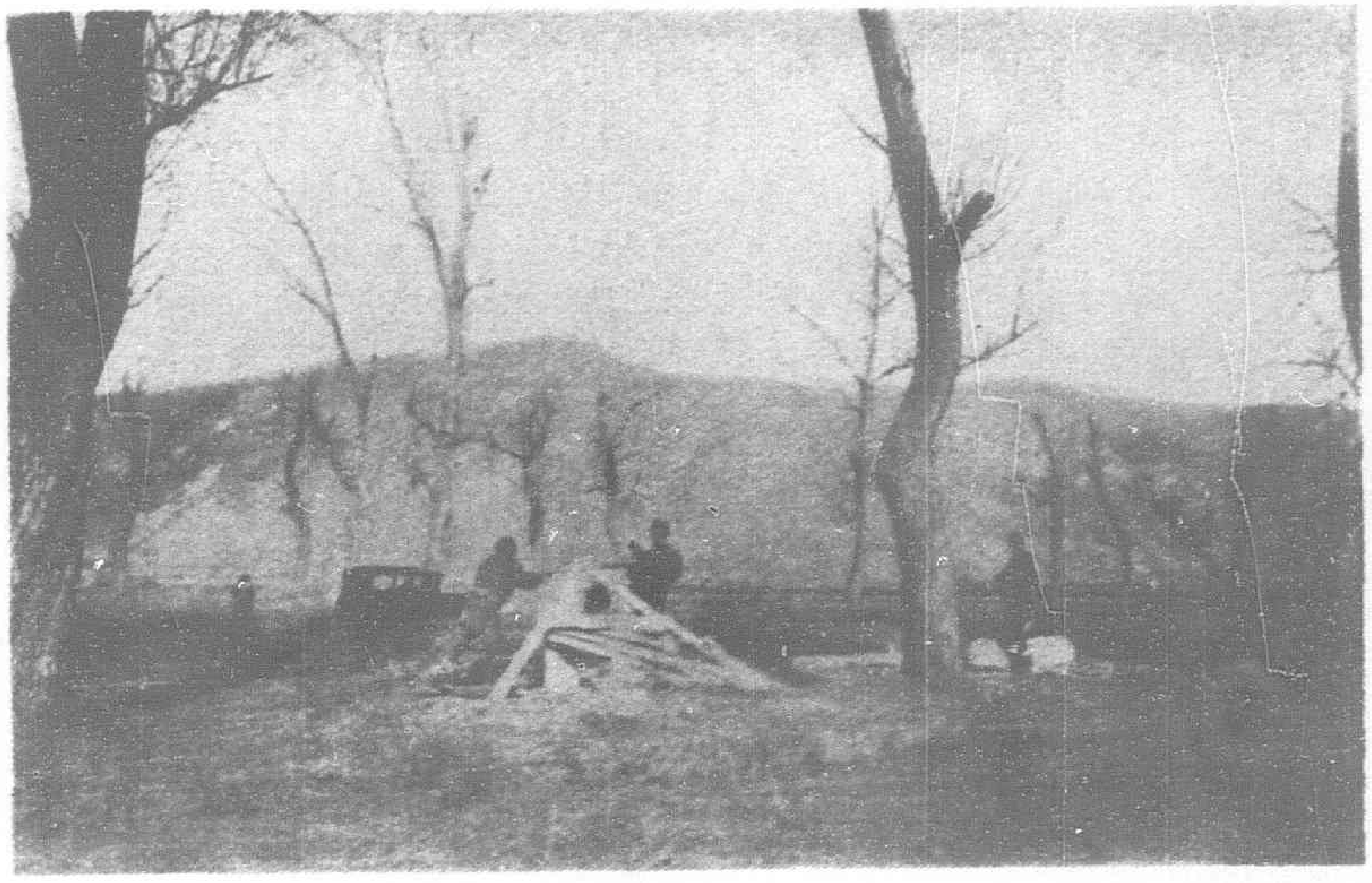
The old road crossing Liupan Pass



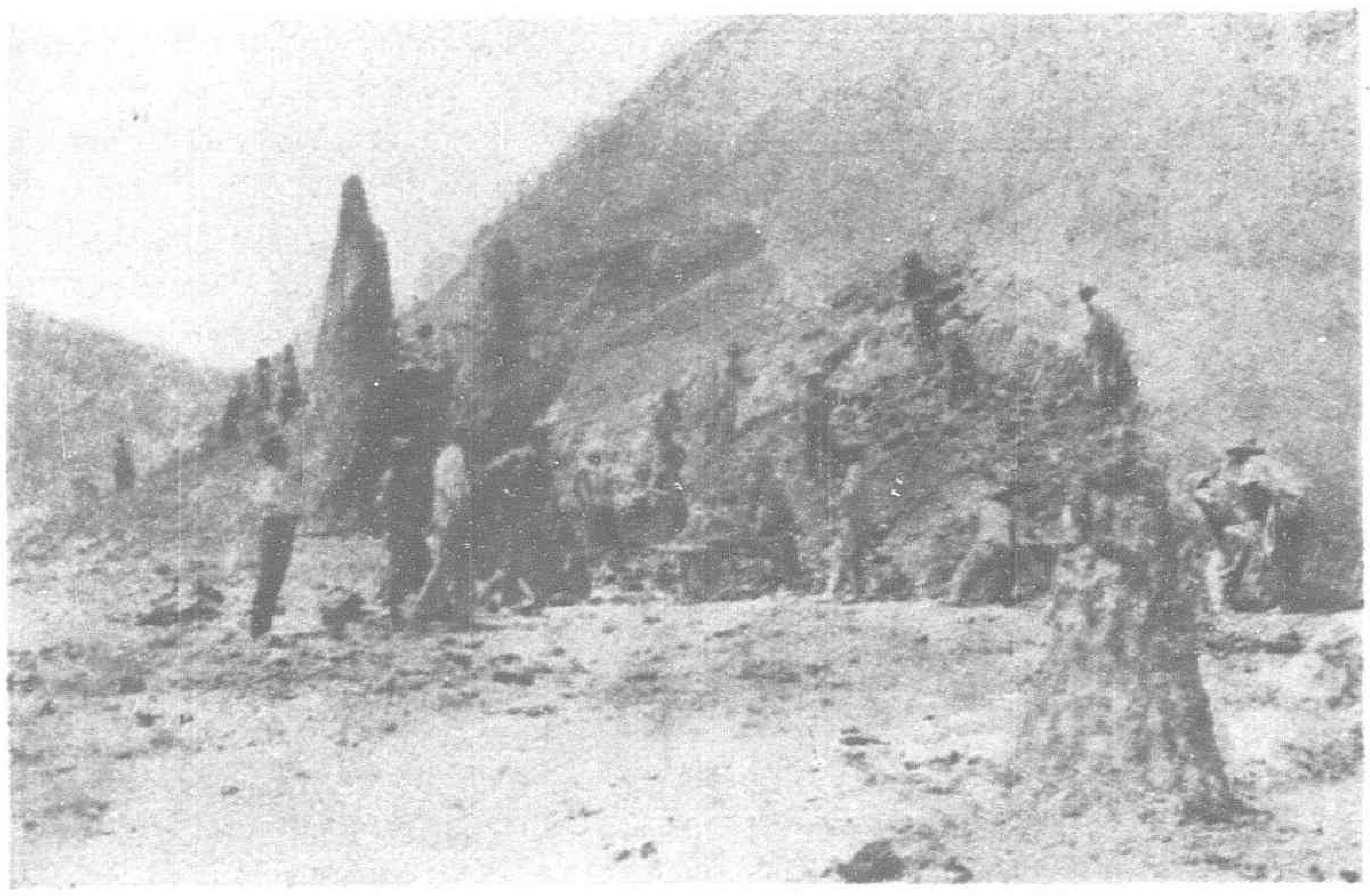
Liupan Pass from completed motor road 200 yards west



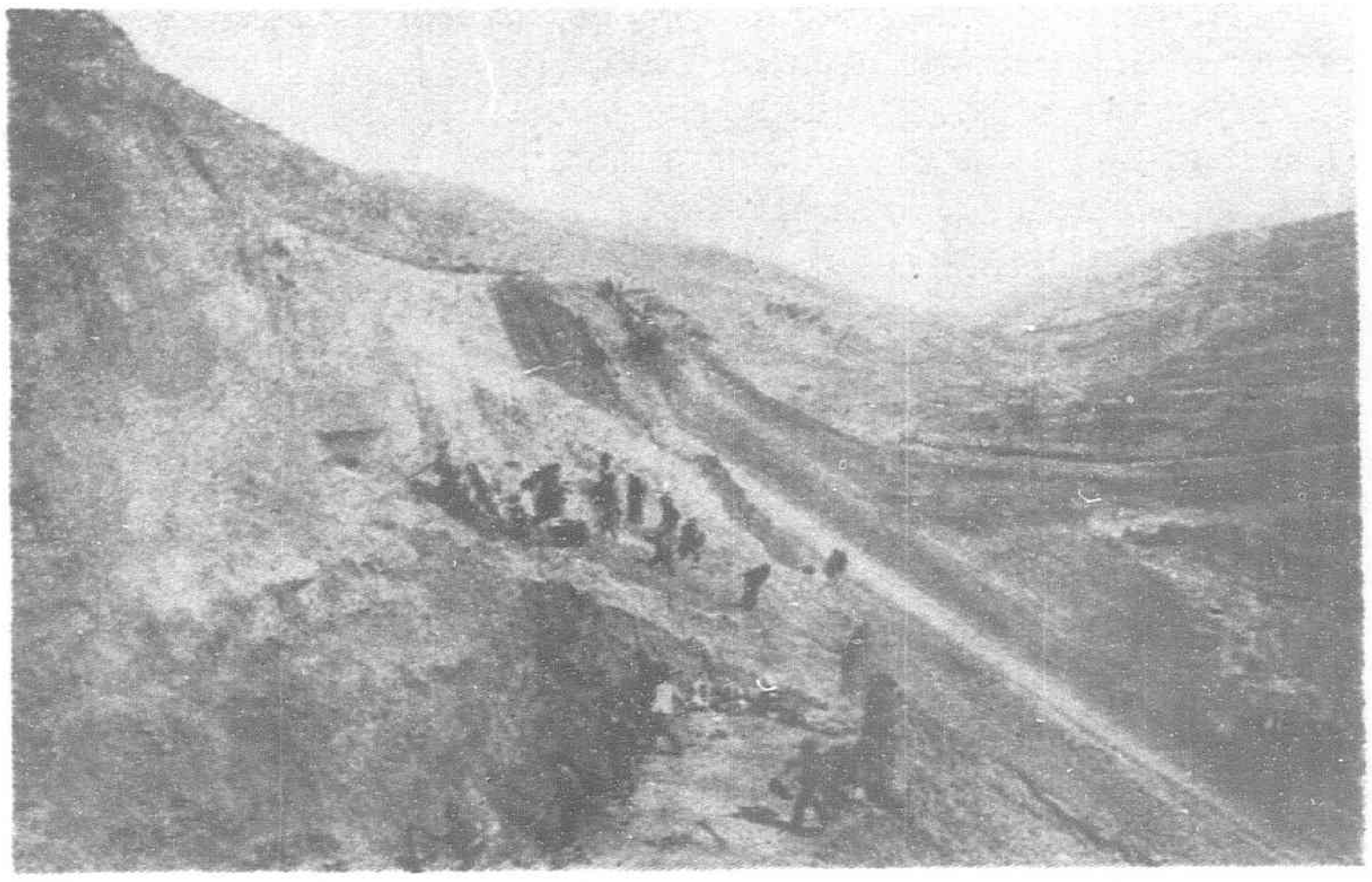
The new 7 per cent grade being built up Tingkow Hill, West Shensi



Sawing bridge plank from Native trees near Pingliang, Kansu



Construction on new road up Taiyu Hill east of Pinchow



Grading new road at west end of Yungshou Hill

per cent. It therefore seems necessary to have some metal work in order to make this road a reliable line of communication from Sian to the North-west. To pave a strip 12 feet wide over stretches aggregating 70 miles of the whole 480, I have recommended expending approximately $360,000.00 in 1934. After that, much depends on policing and up-keep.

Importance of this Road

The Sian-Lanchow road is one of great historic interest and to-day it looms in importance as it has not for many centuries. Both for political and economic reasons this road should be so improved that auto traffic over it will be regular and safe. It need not be an all-metalled road now, but it must have certain parts gravelled or macadamized if it is to be dependable in summer. It must also be better policed so that heavily loaded two wheel carts will not destroy this road built for automobiles and ricshas, for these two last named vehicles will be the means of opening up Kansu and bringing better days.

For the work done to date the provinces benefited—Shensi and Kansu—have been obliged to depend on outside support. The China International Famine Relief Commission has handled the work of the past three years described above. The first $350,000.00 for this work was a gift of China Famine Relief, U.S.A. The next $200,000.00 was a gift of the National Government of China. Funds for the 1934 program will likely be furnished by the National Economic Council of China.

Due to the low price of labor in Shensi and Kansu much of this grading work has been done for 35 cents per fang paid to the workmen or less than 40 cents per fang including all overhead. Heavier cuttings in clay have cost 60 cents to 65 cents per fang, but these higher costs prevailed in only a small portion of the earth work. Rock work cost from 60 cts. to $2.00 per fang on Liupan Shan. The average was around $1.00. Short wooden bridges including abutments cost $20.00 per lineal foot. Planks were whipsawed from trees growing along the road. Hand labor is used in preparing planking as it is in all other phases of this work. No earth scrapers, plows, machine drills, carts, or cars with track were used on this work. Only native picks, hoes, shovels, and baskets were used for earth work and hand drilling was employed in all rock work.

Time Saved in Travel

When the road is completed no grade above seven per cent should exist, with a few exceptions on stretches less than 300 yards long. The completed length should be a few miles less than 480 miles. The time for the journey over this road should be two and one-half to three days by auto as against eighteen days by cart. With ideal weather the trip should be made in two days.

New Mongolian Company

Plans have been completed for a Mongolian industrial company, jointly organized by the Mongolian Affairs Commission and Chinese officials, aiming at the development of Mongolia's resources. Inauguration is pending the approval of the National Government.

A twelve years' contract between the company and the Commission has been tentatively signed with a capitalization of $1,000,000 partly raised by British-American firms and organizations.

The first project covers a long range in raising cattle, sheep and camels, and a factory for corned beef and mutton.

The head office will be at Kalgan the Chahar capital, and the director will be the Chinese Advisor to the Chahar Provincial Government.

Production of Tungsten in China*

The output of tungsten ore in China represents over 60 per cent of the world's total production. Although during prosperous times the monthly export from China has amounted to about 1,000 tons, recently shipments have dropped to some 500 tons a month. Kiangsi, Kwangtung, and Hunan are the three principal tungsten-producing provinces in China, and an account of the resources and production in each province is given in the following survey.

Kiangsi.—The tungsten-mines in Kiangsi are distributed very widely over the 17 districts in the southern part of the province. Even the veins in northern Kwangtung and southern Hunan are supposed to be a continuation of these lodes. Tayu, Kanghsien, Shangyu, Tsungi, Nankang, Huichang, Anyuan, Chiennan and Lungnan are the most important districts for tungsten, and in the first-mentioned districts mines are being worked in 16 different places. Deposits have been also found in Hsunwu, Suichuan, and Yuntu, but these districts being disturbed by bandits, it is impossible to ascertain accurate information.

Hunan.—Tungsten-mines are found in southern Hunan, especially at Jucheng, Kuitung, Linwu and Yaokanghsien on the boundary of Ichang, Tsuhsing, and Chenhsien. Although Chaling, Ninghsien, Kianghua, and Changning produce a certain amount of ore, these deposits are of minor importance.

Kwangtung.—Districts noted for production of tungsten in Kwangtung are Yungyun, and Lokchong, while Tsungfa, Chungshan, Tungkun and Hoyun are also known for this metal. In addition to the districts mentioned, Kityang, Wuhua, Huiyang, Yanping, Tzuchin, Hoifung, Chihing, Meihsien and Paoan also produce supplies of ore.

It was in 1918 that China began to market tungsten ore on a large scale, and out of over 10,000 tons mined that year about 9,400 were exported. Between 1919 and 1928 export business as well as output decreased, but in 1929 a revival of trade was seen, with an output of 9,700 tons of ore. From 1930 to the first half of 1933 was another period of depression, especially in 1932, when the output was slightly over 2,000 tons, but since then the industry has shown considerable improvement, especially during 1934. Although it is too early to obtain accurate figures, a total of 10,000 tons would not be an over-estimation of the 1934 output, and recent prices, about $3,000 (Kwangtung currency, about 15 per cent less than the standard dollar) per ton represent the highest recorded. The following tables show the output in tons of wolframite in Kiangsi, Hunan, and Kwangtung:

Kiangsi

	Tons		*Tons*
1928	7,003	1931	3,500
1929	5,644	1932	2,000†
1930	3,805	1933	5,000†

Hunan

	1929 (*tons*)	*1930* (*tons*)	*1931* (*tons*)
Yaokanhsien	100	117	—
Linwu	95	86	—
Jucheng	140	64	—
Kuitung	85	116	—
Ninghsien	62	115	—
Total	482	498	550

Kwangtung

	1929 (*tons*)	*1930* (*tons*)	*1931* (*tons*)
Yungyun	2,230	1,910	—
Lokchong	45	74	—
Tsungfa	25	—	—
Chungshan	38	20	—
Tungkun	—	11	—
Hoyun	520	60	—
Others	724	358	—
Total	3,582	2,433	2,500

Fukien and Kuichow also produce a small amount of tungsten ore, the output from the two Provinces during 1931 being about 30 tons.

From the above figures it is seen that Kiangsi province occupies the most important position in the production of tungsten, followed by Kwangtung and Hunan. Although mines are found in Tsienan and Funing in Hopei, operations have been suspended for a long time. As there are no accurate statistics showing the output from various provinces, the only information available concerning China's output is to be found in the Customs returns, as almost all the wolframite produced in China is exported. The following tables show exports from 1923 to 1933 and the value and quantity exported to various countries from 1929 to 1932:—

Total Exports

	Tons		*Tons*
1923	4,016	1929	8,725
1924	3,019	1930	8,585
1925	5,916	1931	6,804
1926	7,044	1932	2,044
1927	5,032	1933	6,000†
1928	7,304		

Exports to Various Countries

	1929		*1930*	
	Quantity (*Tons*)	*Value* (*Hk. Tls.*)	*Quantity* (*Tons*)	*Value* (*Hk. Tls.*)
Hongkong ..	4,648	1,514,209	7,519	3,513,719
U.S.A.	1,937	736,315	536	336,156
France	1,100	421,677	219	132,669
Great Britain ..	594	226,784	265	165,614
Germany ..	386	147,582	33	20,516
Japan	5	1,339	11	5,597
Other Countries.	55	21,105	2	1,050
Total ..	8,725	3,069,011	8,585	4,175,321

	1931		*1932*	
	Quantity (*Tons*)	*Value* (*Hk. Tls.*)	*Quantity* (*Tons*)	*Value* (*Hk. Tls.*)
Hongkong ..	6,318	2,791,130	1,440	466,077
U.S.A.	131	63,997	—	—
France	112	52,890	25	7,000
Great Britain ..	—	—	140	41,427
Germany ..	90	42,471	329	99,740
Japan	3	1,387	—	—
Other Countries.	150	70,085	110	33,627
Total ..	6,804	3,021,960	2,044	647,871

It should be mentioned that although in some years the output has been rather small, this was not due to any scarcity of ore, but to sharply dropping prices and laborers quit work because the wages received were less than the cost of living.

In order to ascertain China's position among the world's tungsten-producing countries it is necessary to investigate general conditions and output in various countries. Tungsten is a very rare metal, and is not found in many countries, not a trace being discovered in middle and northern Europe, nor in Africa. Tungsten-producing countries may be classified into five groups, according to output, as follows:—

(1) China, British India, Siam and Korea—in Asia.
(2) Bolivia, Peru, Argentina, and Chile—in South America.
(3) United States and Mexico—in North America.
(4) Portugal, Spain and Italy—in Europe.
(5) Australia and Tasmania.

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*The Chinese Economic Journal

†Approximate

The contribution of China to the world's total production of ore from 1928 to 1930 was over 70 per cent, as shown in the following table :—

	1928 *Tons*	*1929* *Tons*	*1930* *Tons*
China	7,304	8,725	8,585
North America	1,121	789	727
South America	53	1,793	1,096
Europe	839	1,182	870
Australia	244	303	240
Total	9,561	12,792	11,518

The highest price ever recorded for ore was G$1,040 (exchange then being about one gold dollar to two in Chinese currency) per ton, and in 1916—during the Great War—ore was sold at over $1,400 per ton. As the price in Great Britain was only equal to G$720 per ton, while in the United States the price was G$1,040, the largest share of Chinese wolframite went to the latter country during the Great War. After hostilities the price in the United States went down gradually by two-thirds, but owing to the low cost of production was still good enough to attract the greater portion of the Chinese output. Since the enforcement of the revised tariff in September, 1922, conditions in regard to exports to the United States have changed, and instead of going almost solely to that country Chinese wolframite is now distributed among many countries, especially Germany, France, and Great Britain, and prices in 1924 dropped to $300 per ton. Since the latter half of 1933 the demand for tungsten became very keen. The Reconstruction Department of Kwangtung province established control of supplies in 1934, and wolframite prices have increased enormously.

During the period from 1925 to 1932 the largest annual export to the United States amounted to 32,000 piculs, and to France the same amount was exported. Germany took only 1,000 piculs less, while shipments through Hongkong to various countries were as much as 126,000 piculs. It may be assumed that since 1925 Great Britain has been the largest buyer of Chinese wolframite. The following figures show the quantity and value exported from China from 1922 to 1934 :—

	Piculs	*Hk. Tls.*
1922	201,031	1,026,454
1923	66,929	790,191
1924	50,325	554,725
1925	98,605	1,117,517
1926	117,408	1,669,513
1927	83,270	1,250,229
1928	121,741	1,810,569
1929	146,654	3,069,011
1930	144,293	4,175,321
1931	114,357	3,021,960
1932	34,334	647,871
1933	91,590	3,479,975
	(Quintals)	(Dollars)
1934	47,065	6,315,349

The average prices of wolframite per ton from 1929 to 1934 are as follows :—

1929	Tls. 352	1932	Tls. 316
1930	486	1933	$621
1931	444	1934 (Jan.-April)	1,752

Comparing the prices, it will be noted that a low price was recorded in 1929, when output reached its highest level, and there was a sudden jump in 1933, when there was a keen demand for the ore. During 1934 quotations given in newspaper reports stood at over $2,000 per ton. As the output is small, scarcely enough to meet the demand, and control of exports by the Kwangtung Provincial Reconstruction Department prevents any manipulation of the market by exporters, there is every prospect of rising prices.

"The Second Doorway of the Wide World's Trade"

(Continued from page 106)

In January, 1933, four of these machines had flown to Peshawar and back and had met fog and also had motor trouble. One of the lessons of this flight had been the necessity for good wireless and plenty of landing grounds.

During the survey of a flying-boat route across India the Governor of Burma had asked the flying-boat unit to stay and help keep order during the Burmese rebellion which had broken out at the same time. As no air action was allowed, except in the form of dropping pamphlets, the rebels did not take much notice of the flying-boats, as their leaders had told them that they were immune from bullets. When the pamphlets fell without injuring anyone the rebels believed their leaders.

During this survey sixteen sites were examined and six selected. This is the route which was flown by No. 203 (Flying-Boat) Squadron on their way to Melbourne from Basrah.

Speaking of the route from Singapore to Hongkong the Lecturer said that this was still closed to land-planes, but a number of flights had been made to Borneo to locate landing grounds and survey for oil. A survey flight through Sarawak had shown that a great deal of work and money would be needed to make landing grounds there suitable for all weathers.

In the flight to the Philippines they had discovered that the main requirement was good meteorological service. The flying-boats had been separated occasionally by bad weather. The U.S.A. Navy had given them every facility, including a destroyer to act as a wireless link. There was no co-ordination between the meteorological services of Great Britain, France and the United States, all of which operated out there. The most accurate was the French.

In his final summary the Lecturer said that there were stores and other facilities at Singapore for the whole Command and the units were equipped or about to be equipped with modern aircraft. He understood that in 1936 a local Director of Civil Aviation was to be appointed.

He then showed some interesting lantern-slides of the landing grounds on the Calcutta-Singapore route and of the inhabitants of the Andaman and Nicobar Islands.

The Peiping-Hankow Railway

(Continued from page 110)

small capacity and some with only two axles are not suitable for fast traffic. We will be glad to see the day when we can equip the whole railway with new rolling stock of modern design so as to increase efficiency.

Difficulties

In managing and operating this railway the officials are constantly faced with great difficulties, such as shortage of rolling stock, the frequent emergency of military transportation, petty stealing by organized gangsters along the whole railway, sabotage by communists and bandits, floods and many other minor things too numerous to mention. In spite of such adverse conditions we have to do the best we can and even make money for the Government, as well as provide service to the people.

Conclusion

Our present Director, Mr. Chen, who is an experienced man in the railway service and an able executive, is earnestly going at it to improve efficiency in every department. Gradually many of the ill-practices are being eliminated, overstaffing is being reduced as far as possible, and an increase in the volume of business for this year is already noticed. Material purchases are now open and competitive so all merchants doing business with the railway have an equal chance. It is hoped that the Ministry of Railways now working on a new financing scheme to rehabilitate our line can be successful. If a rehabilitation plan can be carried out we will certainly be in a position to increase our business which in turn will reflect to the benefit of all that section of China which is served by the Peiping-Hankow Railway.

Engineering Notes

INDUSTRIAL

STEEL TUBE PLANTS.—Sumitomo Copper and Steel Tubes Co., Osaka, plans to erect a steel tube plant in Manchukuo to cost Y.4,000,000. This company has hitherto exclusively supplied its products to the navy, but intends now to begin selling in the market. The Manchukuo Steel Tubing Industry Co. was to be established last month with a capital of Y.8,000,000 (Y.2,000,000 paid up), to manufacture steel pipes of more than 14 inches by electric welding.

KIANGSI BUS SERVICE.—Omnibus service on the newly constructed highway between Tai-ho and Hingkuo, in southern Kiangsi, has been started. This route is part of the projected Kiangsi-Hunan Inter-Provincial Highway, and links up with the highway network connecting the cities of Lucheng, Shihcheng, Kwangchang and Ningtu, in the south-eastern part of the province.

NORTH-WEST TRANSPORT.—The Provincial Governments of Shensi, Kansu, Chinghai (Kokonor) and Ninghsia, together with the North-western branch of the National Economic Council and the Lung-Hai Railway Administration are jointly organizing a North-west Communications Committee to unify through freight transportation and to maintain and protect traffic services in the North-west.

RAILWAYS

HSUCHOW-LINTUNG LINE.—Direct train service on the Lung-Hai Railway between Hsuchow North-western Kiangsu, and Lintung 59 *li* (17 miles) east of Sian provincial capital of Shensi, was started on November 1. At present, one express will be operated daily.

LARGEST LOCOMOTIVE.—The world's most powerful electric locomotive for passenger service has recently been built in the Soviet Union. It is known as the "2-3-2 PB" and has a capacity of 2,700 h.p. The locomotive can pull 20 passenger cars at a speed of 130 kilometers an hour. It was built in the record time of four months and gave excellent results in its test run.

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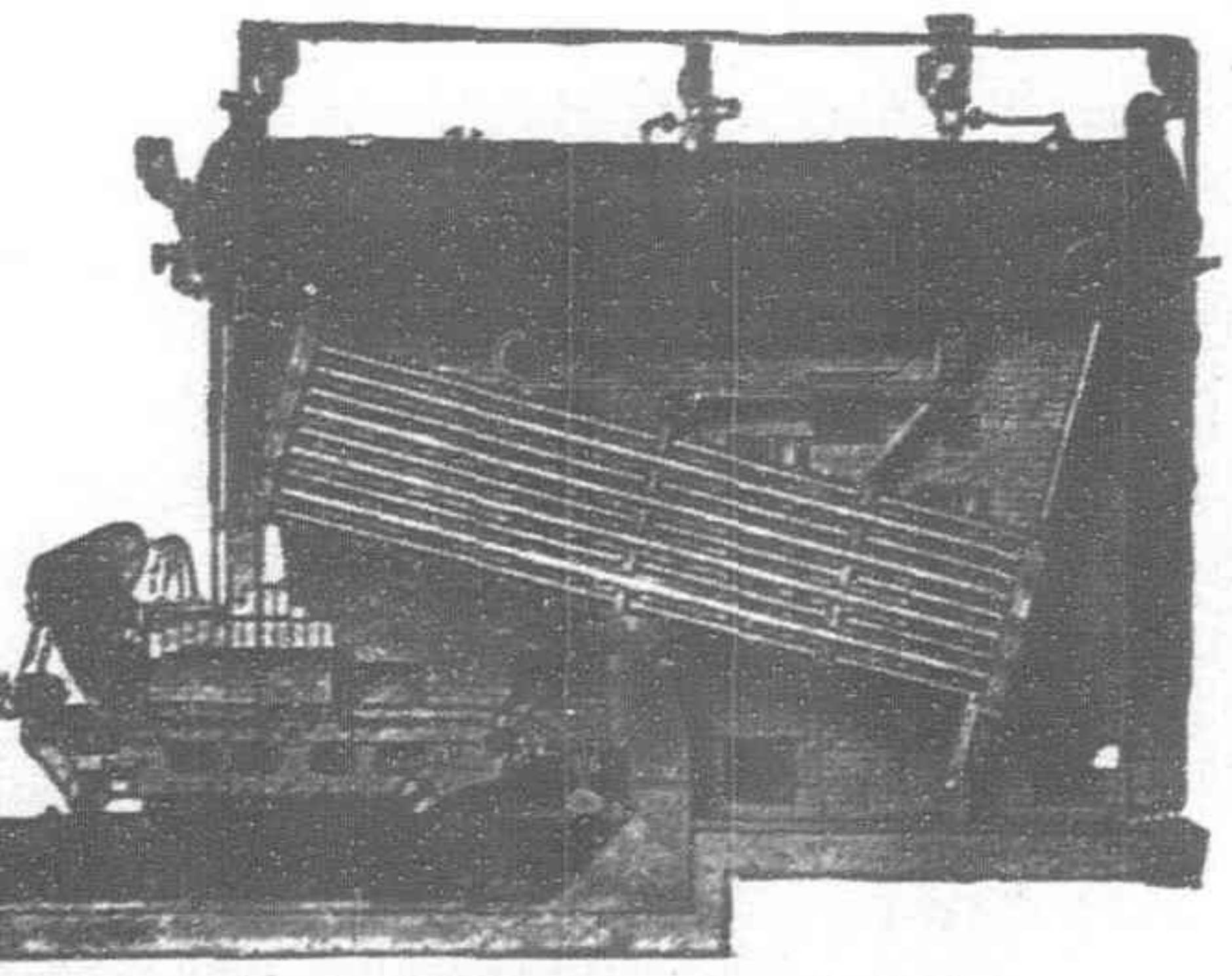

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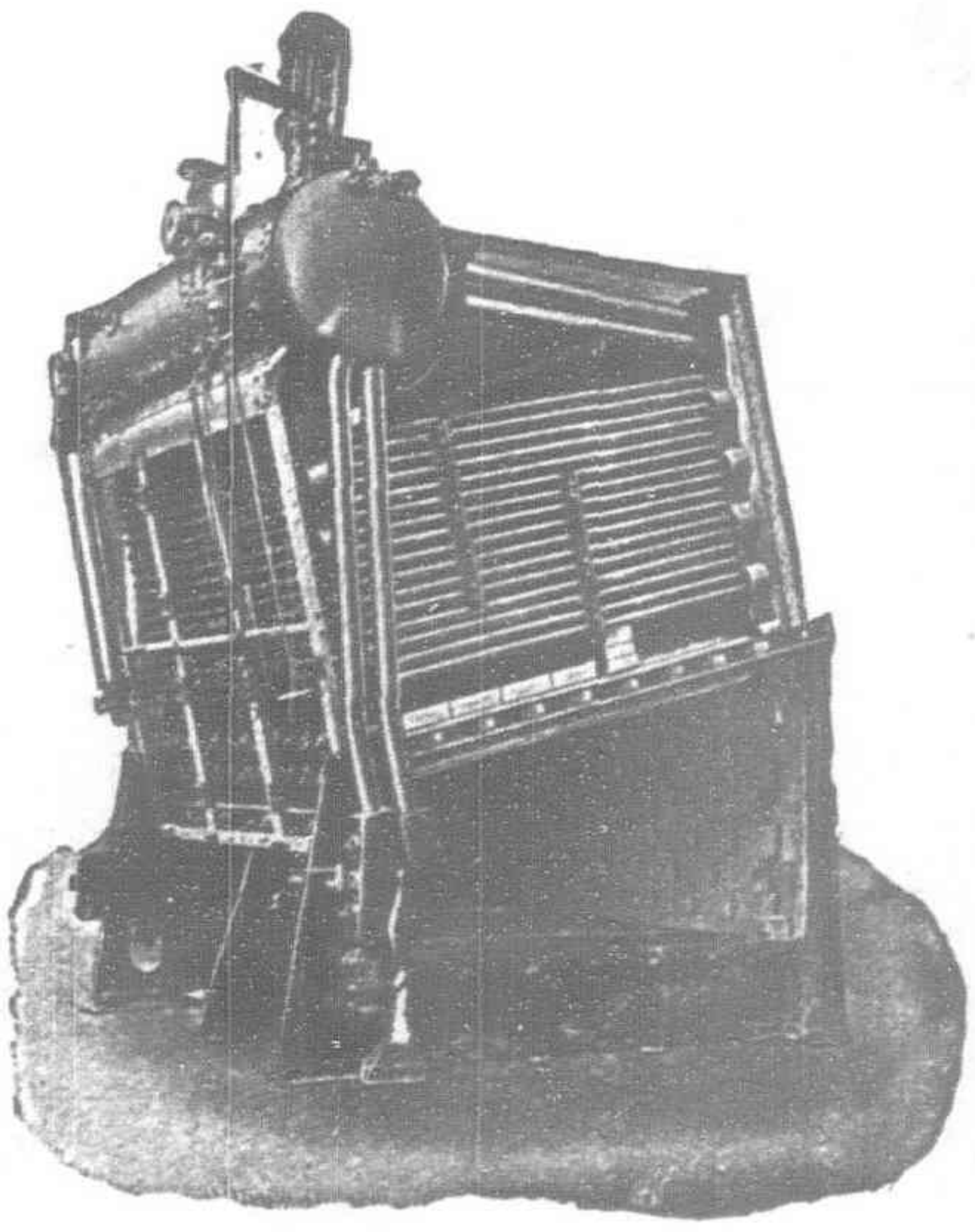

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